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**TECHNICAL MEMORANDUM 4
BACKGROUND SOIL SAMPLING AND ANALYSIS**

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**SUMMARY
SITE INVESTIGATION AND REMEDIATION REPORT
AIRPORT/KLONDIKE AREA
AT
PRATT & WHITNEY
EAST HARTFORD, CONNECTICUT
EPA ID No. CTD990672081**

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Acronyms

AEL	Averill Environmental Laboratory, Inc.
CFR	Code of Federal Regulations
DEP	State of Connecticut Department of Environmental Protection
DPH	State of Connecticut Department of Public Health
FID	Flame-Ionization Detector
F&O	Fuss & O'Neill, Inc.
H&A	Haley & Aldrich, Inc.
LEA	Loureiro Engineering Associates, P.C.
M&E	Metcalf & Eddy, Inc.
NTU	Nephelometric Turbidity Unit
P&W	Pratt & Whitney
PETG	Polyethylene terephthalate copolyester
PID	Photo-Ionization Detector
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QUANT	Quanterra Environmental Services, Inc.
RCSA	Regulations of Connecticut State Agencies
SCS	US Soil Conservation Service
SOP	Standard Operating Procedure
TM	Technical Memoranda
VOC	Volatile Organic Compound

1. INTRODUCTION

1.1 Purpose and Objective

This Technical Memorandum (TM) presents the methodology and results of the soil background metals sampling and analysis methodologies used in the Airport/Klondike Area (the Site) of the Pratt & Whitney (P&W) facility located at 400 Main Street (Main Street facility) in the Town of East Hartford, Connecticut. Background soil metals data were collected from undisturbed areas of the North Klondike, as part of the remediation of the X-194 Test Stand in the North Klondike Area, to characterize the nature and distribution of natural metals in the unconsolidated materials at the Site. Additionally, background soil metals data for glaciolacustrine sediment samples were obtained from soil borings selected from portions of the Airport/Klondike Area where contamination was not identified in the overlying soils.

1.2 Background

The Airport/Klondike Area is located on the eastern portion of the P&W Main Street facility on the east side of the main plant, north of Brewer Street and south of Silver Lane. The Airport/Klondike Area consists of four study areas that include the North and South Airport Areas and the North and South Klondike Areas. Previous investigations at the Site performed from 1990 through 1997, as area-specific investigations and site-wide investigations related to environmental conditions, have resulted in the installation of numerous soil borings, monitoring wells, and surficial soil samples throughout the Airport/Klondike Area.

During the remediation activities associated with the X-194 Test Stand in the North Klondike, soil samples were collected in portions of the North Klondike from reportedly undisturbed areas and areas that have been disturbed, but never used for industrial activities. The X-194 Test Stand was used for the testing of beryllium-based fuels. Therefore, as part of establishing target clean-up levels for the remediation activities, the background concentration of beryllium had to be determined. Analyses for background concentrations in soil were conducted for all of the metals listed in Title 40 of the Code of Federal Regulations, Part 261, Appendix IX (40 CFR 261 Appendix IX). The Appendix IX metals include antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, thallium, tin, vanadium, and zinc, and additionally aluminum, silicon, and sodium.

As part of the most recent site investigation activities, soil borings were installed throughout the Airport/Klondike Area. Analytical data and historical operations information associated with

these selected soil boring locations indicated that these borings were located upgradient of potential contaminant release area. Samples from these soil borings of the underlying glaciolacustrine sediment, generally referred to as clay, were submitted for laboratory analysis of metals. Data from this site characterization has been used as sitewide background data for the current site investigation activities throughout the Airport/Klondike Area.

1.3 Scope

This TM covers the sampling and analyses of the background soil samples collected during the investigation and remediation of the X-194 Test Stand for the period 1993 through 1994, and glaciolacustrine sediment samples collected during various soil boring programs for the period from 1992 through 1997. This TM describes the soil sampling and analytical methods, the analytical results, and the statistical analysis of the data, and the development of background soils metals concentrations.

1.4 General Geologic and Hydrogeologic Conditions

The geologic and hydrogeologic characteristics of the Site are discussed in detail in the main body of this report. In general, the surficial materials in which the majority of the monitoring wells are screened, consist of medium to fine grained sands with trace levels of fine gravels and coarse sands. These sediments are generally post-glacial, fluvial deposits associated with the Connecticut River, although in many places the upper portion of these sediments have been anthropogenically disturbed during on-site construction activities. Beneath the fluvial sediments are glaciolacustrine sediments, primarily laminated silts and clays, associated with glacial Lake Hitchcock. The basal sediment layer over most of the area is glacial till and stratified drift. Bedrock in the general East Hartford area consists of Triassic Age, interbedded arkoses and basalts. Bedrock in the area has a general slight dip eastward cut by widespread steep faults.

The regional drainage basin is the Upper Connecticut River Basin. Regional flow in the unconsolidated materials in this part of the basin is to the west, towards the Connecticut River. Local groundwater flow is also controlled to some extent by local drainage sub-basins and topography. The upper portion of the unconsolidated sediments serves as the primary aquifer in the area. Groundwater flow in the bedrock is primarily within fractures and fault planes, and to a lesser extent within the rock matrix. The local bedrock aquifer would be adequate as a residential water supply source, but groundwater yields are typically too low to be of commercial or industrial use.

1.5 Soil Types

Soils within the Airport/Klondike Area were mapped by the US Soil Conservation Service (SCS) in the 1950s. At that time, the soils at the Site were mapped by the SCS as Made Land, Ninigret Fine Sandy Loam, Windsor Series Loamy Fine Sand, the Walpole Series Loam, the Saco Series Loam, and the Sudbury Series Fine Sandy Loam. The distribution of soil types, as mapped by the SCS (1962), is shown on Drawing TM4-1. These soil types are described by the SCS (1962) as follows.

Made Land *Made land occurs where the surface soil and subsoil have been stripped, and where earth, trash, or both, are used as fill material. It also occurs where sand and gravel have been removed and the unwanted material was left in ridges or mounds. Made land also includes areas where the soil profiles have been disturbed through leveling or other means.*

Ninigret Series The Ninigret Series consists of moderately well drained to somewhat poorly drained soils. These soils are typically coarse to medium textured and are typically developed on glaciolacustrine, glaciofluvial, and stream terrace deposits. These soils have developed from sediments derived from both crystalline rocks and the Triassic shales and sandstones.

Ninigret Series Fine Sandy Loam (0 to 3 percent slopes) *This soil has a light fine sandy loam and sandy loam surface soil and upper subsoil. It is rapidly permeable above the seasonal high water table and has a moderate moisture holding capacity. Because the texture is coarser, it dries out faster in spring than Ninigret very fine sandy loam, 0 to 3 percent slopes. Small areas of loamy fine sand are included with this soil type.*

About 25 percent of the acreage is in forest. Cleared areas are used mainly for tobacco, potatoes, hay, and pasture. Some of the acreage is used for silage corn, sweet corn, vegetables, nursery stock, and alfalfa. Without drainage, the soil generally is suited to silage corn, late vegetables, hay, and pasture. Fully drained or partly drained areas are suitable for tobacco, potatoes, and general crops. However, tobacco and potatoes are subject to damage in very wet seasons during the summer. Fertilizers are needed to produce high yields. Applied plant nutrients, however, leach out fairly rapidly. This soil requires management that will maintain the supply of organic matter and good tilth.

Saco Series The Saco Series consists of frequently flooded, very poorly drained soils on flood plains. These soils, which generally occur in slight depressions that border terrace escarpments or uplands, in old oxbows and narrow floodplains, generally has a dark gray to black silt loam to loamy sand surface. The subsurface of Saco Series soils is generally mottled with gray. Water may stand on the surface of these soils for long periods during the winter and spring.

Saco Silt Loam (0 to 3 percent slopes) *This soil is used mainly for forest, unimproved pasture, and wildlife because it is very poorly drained and frequently flooded. Unimproved pastures furnish some grazing in dry seasons. Drainage is generally not practical because of frequent flooding and the lack of suitable outlets.*

Sudbury Series The Sudbury Series soils consist of moderately well drained soils that have developed on sand and gravel deposits of stream terraces. These soils typically occur in small areas throughout Hartford County.

Sudbury Fine Sandy Loam (0 to 3 percent slopes) *This soil is rapidly permeable, but a seasonal high water table interferes with internal drainage. Mottles at depths of 10 to 18 inches indicate that the lower subsoil is waterlogged in wet seasons. The soil is fairly easy to drain, because it is underlain by sand and gravel. A few areas having slopes of 3 to 6 percent are included with this soil.*

About 60 percent of the acreage has been cleared and is used mainly for hay and pasture. Some acreage is used for tobacco, potatoes, vegetables, silage corn, and other crops. Undrained areas are generally suited to hay, pasture silage corn, and late vegetables. Drained areas are fairly well suited to tobacco, potatoes, and other crops. Even if the soil is drained, tobacco and potatoes are subject to damage in very wet growing seasons. The soil needs fertilizer, drainage for some crops, and management that will maintain tilth and the supply of organic matter.

Windsor Series The Windsor Series soils consist of very droughty sand and loamy soils which have typically developed on nearly level to sloping and rolling terraces. Well-defined dunes occur in areas of loamy fine sand where reworking by wind has taken place. Areas of loamy fine sand and fine sand are essentially free of gravel.

Windsor Series Loamy Fine Sand (0 to 3 percent slopes) *This soil is very rapidly permeable and has a low moisture-holding capacity. It is excessively*

drained and warms very early in spring. It responds to fertilizer when the moisture supply is adequate.

About 75 percent of the acreage is forested, idle, or in urban development. Tobacco and sweet corn are the main crops, but some acreage is used for early vegetables, corn, alfalfa, pasture, and other crops. Alfalfa grows fairly well. This soil is not well suited to crops, hay, and pasture because of droughtiness. A large part of the tobacco, sweet corn, and early vegetables is irrigated. If fertilizer is applied in large quantities, good yields of crops are obtained.

Walpole Series Walpole Series soils consist of moderately coarse to medium texture, poorly drained soils which have developed from sandy or sandy and gravelly stream terrace deposits. Because these soils are poorly drained they qualify as wetland soils under the Regulations of Connecticut State Agencies (RCSA).

Walpole Series Loam (0 to 3 percent slopes) *This soil includes loam, very fine sandy loam, and silt loam textures.*

Use, suitability, and management are essentially the same as for Walpole sandy loam, 0 to 3 percent slopes. (About 50 to 60 percent of the acreage is in forest, and some is idle. A large percentage of the cleared area is used for pasture and hay. Small areas are drained or partly drained and are used for silage corn, sweet corn, tobacco, potatoes, vegetables, and other crops. Undrained areas are best suited to sod crops. Partly drained areas are suited to silage corn and late vegetables. Well-drained areas are fairly well suited to tobacco and potatoes. The soil is not suited to alfalfa and tree fruits. The major needs of this soil are drainage, fertilizer, and lime. The soil is relatively easy to drain because of the sandy, gravelly substrata.) Because of the finer texture, this soil dries out somewhat more slowly in spring. If drained, it is not quite so well suited to cultivated crops.

1.6 Soil Sampling Locations and Rationale

The general distribution of surficial materials as mapped by the SCS (1962) is shown on Drawing TM4-1. The main areas of activity in the Klondike Area were done on Made Land or areas which were once Walpole Fine Sandy Loam. In addition, Ninigret Fine Sandy Loam is also present over large areas of the Klondike. It is thought that the Ninigret Fine Sandy Loam is

compositionally similar to the Walpole Fine Sandy Loam and therefore this soil type was not considered separately.

In addition to the soils developed on the surficial stream terrace deposits, the Airport/Klondike Area is underlain by glaciolacustrine sediments. Although these glaciolacustrine sediments are not exposed at the surface, and none of the soils on the Site have developed directly from these materials, the glaciolacustrine sediments are thought to represent a significant hydrologic boundary. Therefore, samples of the glaciolacustrine sediments were analyzed to provide information regarding the distribution of natural metals in this material.

To provide a comparison between the natural soils and the Made Land present in the North Klondike, eight sampling locations from a reportedly undisturbed area north of the X-194 Test Stand and eight sampling locations from an area of Made Land east of the test stand were chosen. The samples from the undisturbed area were located in an area of Walpole Series soils. Both of the sampling areas were reported to be located sufficiently far from the test stand to have been unaffected by site operations and activities. The X-194 Test Stand is located on an area of Made Land, reportedly created from Walpole Series soils.

Sampling locations were chosen from the Made Land east of the test stand to approximate soil conditions present at the X-194 Test Stand prior to the start of operations, but after the disturbance of the soils. The sampling locations from the Walpole Series soils were selected to approximate soil conditions at the X-194 Test Stand prior to construction. Additionally, the location of the sampling points being sufficiently far from the X-194 Test Stand to have not been influenced by test stand operations.

Samples of the glaciolacustrine sediments were collected during the installation of contaminant delineation borings. Selected samples were analyzed for metals during the course of the various investigations at the Site. Samples included in this TM were selected based on the geologic descriptions provided by the field personnel, the analyses performed on the samples, and the analytical results from overlying samples in that soil boring. In general, samples were selected from areas where metals were not considered the primary contaminants. If possible, to reduce the possibility of contamination from overlying materials, samples selected for this analysis were not the uppermost clay sample logged for the boring, but were from 0.5 to 1 foot below the upper clay boundary.

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The locations of the sixteen soil sampling locations, NK-SB-100 through NK-SB-115, are shown on Drawing TM4-2. The locations of the glaciolacustrine sediment sampling locations are shown on Drawing TM4-3.

2. METHODOLOGY

This section presents the methods and techniques used to collect, describe, and analyze the background soil samples collected in the North Klondike Area by Fuss & O'Neill, Inc. (F&O) (F&O, 1994). In addition, this section provides a brief description of the methods used to collect samples of the glaciolacustrine sediments by Loureiro Engineering Associates, P.C. (LEA).

2.1 General Procedures

Based upon the general location requirements, background soil sampling locations were field located by F&O personnel. The sampling locations appear to have been either randomly selected in the field or selected as representative of the desired soil type based upon the judgment of the field sampling crew. The background soil sampling locations were recorded on the field sampling data sheets, along with other pertinent information. All background soil samples of Made Land and Walpole Series soils were collected on December 17, 1993. Details of the chain-of-custody, storage and handling, and laboratory submission were unavailable.

Background soil sampling was expanded to include glaciolacustrine sediments collected during investigations conducted at various environmental units in the Airport/Klondike Area. The soil borings installed during the most recent investigation activities were installed in general accordance with the procedures described in LEA Standard Operating Procedures (SOP) *Standard Operating Procedure for Geoprobe® Probing and Sampling*, the LEA SOP *Standard Operating Procedure for Geologic Logging of Unconsolidated Sedimentary Materials* and the LEA SOP *Standard Operating Procedure for Soil Sampling*.

2.2 Soil Sampling Methods

2.2.1 Walpole Series and Made Land Soil Sampling Methods

The sixteen Walpole Series and Made Land soil samples were collected by removing the vegetative cover or organic soil layer and troweling a sufficient volume of soil for the analytical procedures directly into 4-ounce, glass sample containers with Teflon®-lined lids. At the time of sample collection, field personnel recorded sample identification information, including sample number, time and date of collection, field personnel identification, and sampling location identifier, and descriptive information for each sample, including soil type, color, apparent grain size information, moisture content, and other appropriate information. This field sampling

information was recorded on field data sheets by F&O personnel. Copies of the field data sheets are included in Attachment A.

2.2.2 Glaciolacustrine Sediment Sampling Methods

Eighteen samples of the glaciolacustrine sediments underlying the upper unconsolidated materials of the Site have been collected from soil borings and submitted for laboratory analysis.

The soil borings selected were ones in which contamination was not identified. These samples were collected using the LEA Geoprobe® direct-push drilling system and Macro-Core® soil sampling system. These methods are more fully described in Technical Memorandum 5, *Soil Sampling*.

In brief, the Geoprobe® direct-push drilling system consisted of a truck-mounted, hydraulically operated percussive hammer device. The hammer was used to drive a sealed Macro-Core® soil sampler to an operator selected depth. At the selected depth, the seal was retracted by the operator, and the sampler was then driven to the final sampling depth which forced soil into the sampler. The sampler was lined with expendable polyethylene terephthalate copolyester (PETG) liners which were removed after the sampler was recovered from the borehole. After the sample liner was removed from the sampler, the contained soil was sampled for specific analytical and geologic requirements, as necessary.

2.3 Analytical Procedures

All sixteen of the surface soil samples were submitted to Ceimic Corporation for analysis of all 40 CFR 261 Appendix IX metals, including antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, thallium, tin, vanadium, zinc, and additionally for aluminum, silicon, and sodium. Laboratory reports for these surface soil samples were submitted directly to P&W and only summary analytical information was reported by F&O (F&O, 1994).

The glaciolacustrine sediment samples were analyzed by Averill Environmental Laboratory, Inc. (AEL). Samples were submitted to AEL were analyzed for arsenic, barium, cadmium, chromium, lead, mercury, nickel, selenium, silver, and zinc. Analytical data from AEL was submitted to LEA directly in both hardcopy and electronic formats and was directly incorporated into the site database maintained by LEA.

2.4 Decontamination of Materials and Equipment

Dedicated sampling equipment was used during the sampling of the Walpole Series and Made Land soils. Field decontamination was not required for the dedicated equipment as it was precleaned and disposed of after a single use.

Samples of the glaciolacustrine sediments were not collected as part of a separate soil sampling program, but were anecdotal samples obtained during the installation of various soil borings. The purpose of consistent decontamination procedures was to prevent the potential spread of contamination between boreholes and samples, and from the immediate work area around the well borehole. All equipment and materials placed into a borehole or associated with the collection and sampling of soil from a borehole was decontaminated prior to initiating the drilling activities and between individual samples, as appropriate. Decontamination procedures are presented in the LEA SOP *Standard Operating Procedure for Hollow Stem Auger Soil Borings*.

Downhole equipment (e.g., drill rod, Macro-Core[®] sampling tubes, etc.) were decontaminated prior to initiating any drilling activities at the Site. Sampling equipment such as Macro-Core[®] sampling tubes and stainless steel spatulas were decontaminated between uses in the field at the drilling site or the decontamination pad. The decontamination pad was typically a portable plastic or metal basin of sufficient volume to hold drilling equipment which could be laid beneath the back end of the drilling rigs to contain the spent decontamination fluids.

The sampling equipment was decontaminated using the following procedure:

- Brush off gross soil particles.
- Wash and scrub equipment with phosphate-free detergent.
- Rinse equipment with deionized water.
- Rinse equipment with dilute nitric acid solution.
- Rinse equipment in deionized water.
- Rinse equipment with dilute methanol in water solution.
- Rinse equipment in deionized water.
- Allow equipment to air dry.

The decontamination water was maintained in 5-gallon buckets during use, and transferred to 55-gallon drums for disposal. LEA field personnel were responsible for preventing cross-contamination between soil samples collected for laboratory analysis. Sample preparation tables

were covered with clean, disposable plastic. Clean, disposable plastic was also laid on the ground beneath the sample preparation tables and the decontamination solutions to catch dropped soil and spilt decontamination solutions.

2.5 Sample Location Identifiers

Monitoring wells, as well as piezometers, stream gauges, soil borings, surface water and sediment sampling locations have been identified using a systematic method to prevent duplication of location identifiers, and relatively easy means of finding the referenced location on site maps. All areas of the Pratt & Whitney East Hartford facility (including the Andrew Willgoos Turbine Laboratory, the Colt Street wastewater treatment facility, and other areas of the facility not included in this TM) have been assigned two-letter identifiers based upon the common name for the area. These two-letter designations are presented in Table 1.

In addition, each type of sampling location has been assigned a two-letter designation to distinguish the various type of sampling, locations possible. The two-letter designations for the various sampling locations are also presented in Table 1. Because of the large number of soil and water monitoring locations existing on site, and the large areas involved, the Airport and Klondike areas have each been broken down into northern and southern sections. All monitoring and sampling locations have been given a location identifier based on their location in the Airport or Klondike Areas, the type of sampling or monitoring location, and finally a sequential numeric identifier based upon the specific type of location.

2.6 Waste Management

All spent decontamination fluids generated during drilling activities and purge water generated during monitoring well development activities for the site characterization was placed in 55-gallon closed-top drums supplied by P&W for subsequent off-site disposal by P&W. The drums were labeled, the wells contributing to each was listed, and the information tracked to aid in waste characterization and disposal.

All soil cuttings generated during drilling activities were placed in 55-gallon open-top drums supplied by P&W for subsequent off-site disposal by P&W. The drums were labeled, the locations contributing to each was listed, and the information tracked to aid in waste characterization and disposal.

2.7 Health and Safety

Sampling was performed by F&O personnel under their corporate, site-specific health and safety plan. Loureiro Engineering Associates field crews conducted field operations in accordance with the LEA Site Health and Safety Plan. In general, soil sampling was conducted in modified Level D personal protective equipment (PPE) consisting of safety glasses, surgical or nitrile gloves, and hard hats and steel-toed shoes for the drill rig operators.

3. RESULTS AND CONCLUSIONS

3.1 Soil Types

At the time the background soil samples were collected by F&O personnel, a description of the collected soil was recorded on the field data sheets. The sixteen soil samples collected appear to fall into groups, based primarily upon the soil color and descriptions provided on the field sampling records. The eight samples collected from north of the X-194 Test Stand, NK-SB-100 through NK-SB-107, and one sample collected from east of the test stand area, NK-SB-108, were described as very dark brown (reported as a dusky yellowish brown, but noted as having a Munsell® color designation 10YR 2/2), medium to fine grained sand. Four of the samples collected from east of the test stand area, NK-SB-109 through NK-SB-112, were described as black (reported as brownish black, but noted as having a Munsell® color designation 5YR 2/1), fine to medium sand. Three of the samples collected from east of the test stand area, NK-SB-113 through NK-SB-115, were described as reddish brown (reported as a medium yellowish brown, but noted as having a Munsell® color designation 10YR 5/4), coarse to fine grained sand.

Descriptions of the sampling locations from the area north of the test stand area, NK-SB-100 through NK-SB-107, indicate that the soils in the general area may have been influenced to some degree by human activities. Identified in the descriptions are an access road, a chain-link fence, a “depression,” a pile of wood chips, and the diverted unnamed stream. The presence of these entities indicates some degree of prior human activity in the area, however, they do not indicate that the soils were definitely altered. Two of the samples, NK-SB-103 and NK-SB-105, were reported to have foreign material described as “wood chips” present. All but two of the samples, NK-SB-106 and NK-SB-107, were identified as “wetland” soils on the field sampling records.

Descriptions of the sampling locations from east of the test stand area, NK-SB-108 through NK-SB-115, indicate that samples from NK-SB-109 through NK-SB-111 were collected from the top of two “ridges” in the area, sample NK-SB-112 was collected from a lowland area between the two ridges, and samples from NK-SB-108, NK-SB-113 through NK-SB-115 were collected in various other locations in the general vicinity. The soil sample collected from NK-SB-113 was identified as a “wetland” soil on the field sampling record.

SCS mapping of the soils appear have some inconsistencies. For instance, areas of the North Airport where the paved landing field exists are mapped as natural soils and should have been mapped as Made Land. Additionally, areas of the Klondike where historical operations and construction activities have occurred are also mapped as natural soils and should have been

mapped as Made Land. These apparent inconsistencies are due to the timing of the field mapping, the construction activities in the Airport/Klondike Area, and the aerial photography that was done for publication. The northeast corner of the Airport runway was extended, and construction activities in the Klondike were commenced after the field mapping activities, but before the aerial photography was performed.

For the initial analysis of these samples, F&O divided the samples into Walpole soils and Made Land, based upon the SCS mapping. However, based upon the field descriptions of the soils recorded at the time of sampling, F&O identified two soil samples, originally collected as Walpole Series soils north of the test stand area, as being more consistent with Made Land soils and grouped these results with the Made Land data. The report did not explicitly identify the two samples, however it appears that the samples were NK-SB-106 and NK-SB-107, because these samples were ^{NOT} identified as "wetland" soils on the field sampling records, and it appears that the data from these samples were incorporated into the Made Land data during the statistical analyses. Consequently, F&O identified six Walpole soil data and ten Made Land soil data.

In general, these divisions appear to be adequate based upon the descriptions of the Walpole Series provided by the SCS, and the soil descriptions provided by the field sampling crews. The soil descriptions provided by the field sampling crews are not detailed soil descriptions, but are Burmister soil descriptions. No indication of visually identifiable disturbances to the soil structure, the presence or absence of soil structure, or other standard soil descriptions are provided.

3.2 Analytical Results

3.2.1 Walpole Series and Made Land Soils Analytical Results

Walpole Series and Made Land soil samples were submitted for analysis for the metals listed in 40 CFR 261 Appendix IX, including antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, thallium, tin, vanadium, and zinc, and additionally for aluminum, silicon, and sodium. Summary analytical results for the Walpole Series and Made Land soil samples are presented in Table 2. No antimony, silver, thallium, or tin was detected in any of the Walpole Series or Made Land soil samples collected.

3.2.2 Glaciolacustrine Sediment Analytical Results

Glaciolacustrine sediment samples were submitted for analysis of arsenic, barium, cadmium, chromium, lead, mercury, nickel, selenium, silver, and zinc. Arsenic, barium, cadmium,

chromium, nickel, and zinc were detected in the majority of the samples submitted for analysis. Lead was detected in only one sample, and mercury was detected in two samples. Summary analytical results for the glaciolacustrine sediment samples submitted for analysis are presented in Table 3. No selenium or silver was detected in any of the glaciolacustrine sediment samples submitted for analysis.

3.3 Statistical Analysis of Walpole Series and Made Land Soils Metals Concentrations

A statistical analysis of the metals data was performed to determine the average concentration of each of the metals detected in the soil samples and to estimate a maximum concentration of each analyzed metal likely to occur naturally in the onsite soils. The data from each soil type were analyzed separately. Data were analyzed to determine whether they followed a normal distribution, and for the presence of outliers. After a final data set and statistical distribution were decided upon, the data were analyzed to determine the various parameters of the data set necessary to describe the maximum expected concentrations of the detected metals in unaltered soil samples. It should be noted that, although it was not explicitly stated, non-detects were replaced by one half the detection limit in the statistical analyses and distribution testing (F&O, 1994).

The statistical test for normality of the data was the Kolmogorov-Smirnoff Test. Based upon the results of these tests, data sets may have been log-transformed and the distribution of the transformed data retested to determine its distribution. If the data were not adequately represented by either a normal or a log-normal distribution, non-parametric statistics were used to describe the data.

The data sets were inspected to determine if outliers appeared to exist, and suspected outliers were tested using the method described in “*Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities*” (EPA 1989). Data points were rejected if there was less than a five percent chance of that value having come from the population as sampled. Entire soil samples were not rejected if selected metals analyses data from that boring were rejected as outliers. That is, outliers were treated as if they were the result of random sampling or analytical errors independent of other sampling or analytical parameters. Although no evidence was presented to indicate a justification for treating these extreme values as true outliers, removal of these data from the set of values results in a more conservative estimate of the population mean and the estimated maximum likely concentration of each metal.

After a suitable distribution was determined, descriptive statistics were calculated to characterize the metals concentrations and determine the maximum expected metals concentrations for the Walpole Series and Made Land soils. The maximum expected concentration was operationally defined as the 95th percentile estimate for the population. The 95th percentile of the population is the concentration below which 95 percent of the population fall. The upper 95th percentile of a normally or log-normally distributed population was estimated from sample data using the following equation:

$$\bar{X}_{95} = \bar{x} + t_{0.05} \cdot s$$

where: \bar{X}_{95} is the 95th percentile of the population ,
 \bar{x} is the sample mean,
 $t_{0.05}$ is the Student's *t*-statistic value for a significance level of five percent, and
 s is the standard deviation of the sample.

Except for beryllium, cadmium and silver, of the six samples identified as Walpole soils, four to six of the samples contained detectable concentrations of the metals analyzed. For beryllium, cadmium, and silver, a value equal to one-half the detection was used in place of the non-detects.

The use of one-half the detection limit in place of the non-detect does not bias the estimate of the mean, but can bias the estimate of the standard deviation of a population (Gilbert, 1989). It is believed that, due to the relative values of the detection limit and the detected concentrations, the relative error associated with this method is acceptable for the uses of the data and is likely to be on the order of the associated measurement errors.

3.4 Statistical Analysis of Glaciolacustrine Sediments Metals Concentrations

The metals concentrations in the glaciolacustrine sediments were calculated in the same manner as the metals concentrations in the Walpole Series and Made Land soils. Only one glaciolacustrine sediment sample contained a detectable concentration of lead, and none contained detectable concentrations of selenium or silver. Two samples contained detectable concentrations of mercury. The remaining metal analytes, arsenic, barium, cadmium, chromium, nickel, and zinc, were detected in between twelve and seventeen of the samples.

The glaciolacustrine sediment metals data were analyzed to determine whether the data could be considered normally distributed. Following the methodology used for the analysis of metals concentrations in the background soils, non-detects were replaced by one-half the detection limit. The use of one-half the detection limit in place of the non-detect does not bias the estimate of the

mean, but can bias the estimate of the standard deviation of a population (Gilbert, 1989). It is believed that, due to the relative values of the detection limit and the detected concentrations, the relative error associated with this method is acceptable for the uses of the data and is likely to be on the order of the associated measurement errors.

In general, the data were not normally distributed. Logarithmic and exponential transformations were unsuccessful in producing a normally distributed data set. No samples were rejected as outliers based upon a lack of evidence for erroneous or improper data or samples.

Because of the general lack of normality, and in the interest of maintaining a consistent set of comparison, non-parametric analyses were used to calculate the maximum expected concentrations for each of the metals in the glaciolacustrine sediments. The maximum expected concentration was operationally defined as the 95th percentile estimate for the population. The 95th percentile of the population is the concentration below which 95 percent of the population fall. The upper 95th percentile of a non-parametric distribution was calculated by regressing the sample rank against concentration to determine the rank of the 95th percentile.

3.5 Average Walpole Series and Made Land Soil Metals Concentrations

The maximum expected concentrations of metals, as determined from the analyses of Walpole Fine Sandy Loam soil samples collected from the area north of the X-194 Test Stand area are presented in Table 4. Also included in Table 5 are similar concentration values from the Made Land soil samples.

It was noted in the original F&O report that, except for aluminum, the metals concentrations are higher in the Walpole soil samples than in the Made Land soils. F&O attributed this to the presumably generally higher humic and organic content, and higher water content of the Walpole soils, based on the fact that these soils are poorly drained, wetland type soils. The organic and humic content of these soils would complex with metals and bind them to the organic materials.

The background reference concentrations statistically calculated from the soils analyses were also compared to published reference concentrations of metals from *Elemental Concentrations in Soils and Surficial Materials of the Conterminous United States*, (Shacklette and Boerngen, 1984) to determine if the values were “reasonable.” Data from Shacklette and Boerngen (1984) is presented in Table 7.

In general, the reference concentrations determined statistically from the background soil sampling are within the limits of observed soil metals concentrations reported in Shacklette and

Boerngen (1984), and most are also sufficiently close to the average observed concentrations to be considered “reasonable.” The only exception is the reference concentration of cadmium for the Walpole soils, which was calculated as 0.88 mg/kg and Shacklette and Boerngen (1984) report an observed maximum of 0.7 mg/kg. However, the reference concentration of 0.88 mg/kg was calculated based on two detects and four non-detects and the small deviation from a reported average concentration is not considered significant.

3.6 Average Glaciolacustrine Sediments Metals Concentrations

The maximum expected concentrations of metals in the glaciolacustrine sediments, as determined from the analyses of glaciolacustrine sediment samples from various areas of the Site, are presented in Table 6.

The metals concentration data were not compared to observed soil metals concentrations reported by Shacklette and Boerngen (1984), because these data do not represent the same type of materials as the glaciolacustrine sediments. In general, however, the reference concentrations determined statistically from the glaciolacustrine sediment analyses are similar to the data presented by Shacklette and Boerngen (1984). The glaciolacustrine sediments appear to have significantly higher concentrations of cadmium, mercury, and nickel than the materials analyzed by Shacklette and Boerngen (1984).

Metals concentrations in the glaciolacustrine sediments is a result of the initial metals content of the sediments, and subsequent metals adsorption on clay minerals during diagenesis. The metals adsorbed onto the clay mineral surfaces would be a function of the available metals, the type of clay minerals present, and the geochemistry of local groundwaters.

3.7 Conclusions

Sitewide background soil metals concentrations in Walpole Series soils and Made Land soils in the North Klondike were estimated based on soil samples collected from specific soil series in the area. Generally, the number of data points appears adequate for the Walpole Soils and Made Land areas. Although the number of data points is somewhat restricted, it is likely that additional sampling would be difficult and that the reference concentrations would not change significantly. In fact, it is possible, based on the previous decision to discard apparent outliers, that the reference concentrations would increase.

The calculated reference concentrations appear to be conservatively estimated and adequately distributed in the areas reported to represent undisturbed areas of the Site. The statistical analysis

of the data appears to be adequate, and the elimination of the extreme values from selected populations represents a conservative estimate of the population parameters. The calculated reference concentrations of metals in soils compare favorably to published values for occurring metals in natural soils in the United States.

Metals concentrations in the glaciolacustrine sediments underlying the upper unconsolidated sediments were estimated based on eighteen selected analyses. These data were analyzed statistically in a manner similar to that used for the Walpole Series and Made Land soils. In general, metals analyses for the glaciolacustrine sediments are similar to, but not directly comparable to, the metals data for the on-site background soils and “typical” surficial materials.

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TABLES

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Table 1
Area and Sampling Type Identifiers
Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut

Area Designation	Area	Sampling Type Identifier	Explanation
AB	Within A Building	MW	Monitoring Well
BB	Within B Building	PZ	Piezometer
CB	Within C Building	SW	Surface Water
DB	Within D Building	SD	Sediment
EB	Within E Building	CC	Concrete Chip
FB	Within F Building	SS	Surface Soil
GB	Within G Building	SB	Soil Boring
HB	Within H Building		
JB	Within J Building		
KB	Within K Building		
LB	Within L Building		
MB	Within M Building		
CS	Colt Street Facility		
EA	Engineering Area		
ET	Experimental Test Airport Laboratory		
LM	Area Outside Buildings L and M		
NA	North Airport Area		
NT	North Test Area		
NW	North Willgoos Area		
PH	Powerhouse Area		
SA	South Airport Area		
SK	South Klondike Area		
ST	South Test Area		
SW	South Willgoos Area		
WT	Waste Treatment Area		
XT	Experimental Test Area		

**Metals Concentrations in Walpole Series and Made Land Soils
Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut**

Boring Number	Description	Soil Type		Percent Solids	Constituent				
		Mapped	Determined		Aluminum	Antimony	Arsenic	Barium	Beryllium
NK-SB-100	Dusky brown (5YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	71.4	2900	7.1 U N	1.1 B	8.3 B	0.09 U
NK-SB-101	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	56.9	4400	8.3 U N	4.4	22.5 B	0.11 U
NK-SB-102	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	42.3	3290	12.2 U N	3.9 B	49.8 B	0.16 U
NK-SB-103	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	46.3	4260	7.9 U N	4.7	55.1 B	0.34 B
NK-SB-104	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	68.0	2670	6.6 U N	2.9	8.2 B	0.11 B
NK-SB-105	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	50.2	3620	8.9 U N	5.3	33.5 B	0.13 U
NK-SB-106	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	52.5	3960	8 U N	3.8	28.2 B	0.12 U
NK-SB-107	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	63.6	5210	7.5 U N	1.5 B	46.8 B	0.30 B
NK-SB-108	Dusky yell. brown (10YR 2/2) fine to med. sand	Made Land	Made Land	82.4	4930	4.5 U N	1.8	8.2 B	0.13 B
NK-SB-109	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	84.9	7980	5.6 U N	1.7 B	14.1 B	0.21 B
NK-SB-110	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	78.1	8110	6.8 U N	20 B	11.1 B	0.21 B
NK-SB-111	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	75.7	8620	6.7 U N	2.5	10.4 B	0.21 B
NK-SB-112	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	76.7	4000	5 U N	0.95 B	8.1 B	0.1 B
NK-SB-113	Dusky yell. brown (10YR 2/2) fine to coarse sand	Made Land	Made Land	77.3	4860	6.8 U N	1.9 B	6.8 B	0.12 B
NK-SB-114	Med. yell. brown (10YR 5/4) fine to coarse sand	Made Land	Made Land	76.8	3730	5.2 U N	1.7 B	16.4 B	0.11 B
NK-SB-115	Med. yell. brown (10YR 5/4) fine to coarse sand	Made Land	Made Land	71.8	3220	6 U N	1.2 B	8.8 B	0.16 B

**Metals Concentrations in Walpole Series and Made Land Soils
Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut**

Boring Number	Description	Soil Type		Constituent					
		Mapped	Determined	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury
NK-SB-100	Dusky brown (5YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	0.37 U	2.1 U	0.96 B	3.2 B	13.0	0.06 U
NK-SB-101	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	0.45 U	8.7	1.5 B	15.6	114	0.18
NK-SB-102	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	0.86	11.2	3.5 B	25.7	294	0.51
NK-SB-103	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	0.78	9.2	2.2 B	29.2	190	0.29
NK-SB-104	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	0.39 U	2.7	0.73 U	7.1	29.1	0.06 U
NK-SB-105	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	0.51 U	5.7	1.2 B	13.7	109	0.24
NK-SB-106	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	0.50 U	3.4	0.92 B	16.9	67.7	0.11 B
NK-SB-107	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	0.41 U	2.5 B	1.0 B	1.7 U	12.8	0.08 U
NK-SB-108	Dusky yell. brown (10YR 2/2) fine to med. sand	Made Land	Made Land	0.32 U	6.2	3.1 B	6.4	12.0	0.05 U
NK-SB-109	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	0.31 U	6.8	2.5 B	4.6 B	15.2	0.16
NK-SB-110	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	0.34 U	7.1	2.2 B	6.0 B	17.4	0.05 U
NK-SB-111	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	0.32 U	7.4	2.0 B	5.1 B	15.4	0.06 U
NK-SB-112	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	0.34 U	5.3	2.2 B	5.3	7.4	0.06 B
NK-SB-113	Dusky yell. brown (10YR 2/2) fine to coarse sand	Made Land	Made Land	0.33 U	4.2	1.8 B	4.0 B	13.8	0.06 U
NK-SB-114	Med. yell. brown (10YR 5/4) fine to coarse sand	Made Land	Made Land	0.32 U	6.1	8.1 B	5.3	3.8	0.06 U
NK-SB-115	Med. yell. brown (10YR 5/4) fine to coarse sand	Made Land	Made Land	0.34 U	5.5	2.9 B	5.2	3.5	0.15

Table 2
Metals Concentrations in Walpole Series and Made Land Soils
Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut

Boring Number	Description	Soil Type		Constituent					
		Mapped	Determined	Nickel	Selenium	Silver	Sodium	Thallium	Vanadium
NK-SB-100	Dusky brown (5YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	4.5 U	0.53 U	0.26 U N	50.5 B	1.1 U	7.4 B
NK-SB-101	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	7.8 B	0.62 U	0.31 U N	56.9 B	1.2 U	26.1
NK-SB-102	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	18.3	1.3 B	1.4 B N	92.2 B	1.8 U	33.6
NK-SB-103	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	12.4	1.3 B	0.71 B N	53.1 B	1.2 U	23.5
NK-SB-104	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	4.1 U	0.86 B	0.24 U N	49.9 B	0.97 U	11.6 B
NK-SB-105	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	5.6 U	1.0 B	0.33 U N	59.3 B	1.3 U	27.7
NK-SB-106	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	5.1 U	1.6 B	0.30 U N	65.0 B	1.2 U	20.1
NK-SB-107	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	4.7 U	0.60 U	0.28 U N	62.3 B	1.1 U	6.4 B
NK-SB-108	Dusky yell. brown (10YR 2/2) fine to med. sand	Made Land	Made Land	15.2	0.56 U	0.17 U N	37.4 B	0.6 U	18.1
NK-SB-109	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	4.3 B	0.33 U	0.21 U N	40.1 B	0.83 U	17.6
NK-SB-110	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	4.3 U	0.48 B	0.25 U N	48.6 B	1.0 U	19.4
NK-SB-111	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	4.2 U	0.37 U	0.25 U N	36.7 B	1.0 U	18.6
NK-SB-112	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	4.8 B	0.71 B	0.18 U N	43.7 B	0.73 U	12
NK-SB-113	Dusky yell. brown (10YR 2/2) fine to coarse sand	Made Land	Made Land	4.6 B	0.50 B	0.25 U N	44.0 B	1.0 U	15.5
NK-SB-114	Med. yell. brown (10YR 5/4) fine to coarse sand	Made Land	Made Land	8.2	0.39 U	0.19 U N	44.7 B	0.78 U	10.9
NK-SB-115	Med. yell. brown (10YR 5/4) fine to coarse sand	Made Land	Made Land	6.4 B	0.37 U	0.31 B N	36.3 B	0.74 U	8.7

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Metals Concentrations in Walpole Series and Made Land Soils
Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut

Boring Number	Description	Soil Type		Constituent		
		Mapped	Determined	Zinc	Tin	Silicon
NK-SB-100	Dusky brown (5YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	4.8 B	15.6 U	712 N
NK-SB-101	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	26.5	18.2 U	721 N
NK-SB-102	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	53.3	26.6 U	1240 N
NK-SB-103	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	43.6	17.3 U	520 N
NK-SB-104	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	6.0	14.3 U	882 N
NK-SB-105	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	23.7	19.4 U	878 N
NK-SB-106	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	13.6	17.6 U	532 N
NK-SB-107	Dusky yell. brown (10YR 2/2) fine to med. sand	Walpole Fine Sandy Loam	Made Land	8.6	16.4 U	869 N
NK-SB-108	Dusky yell. brown (10YR 2/2) fine to med. sand	Made Land	Made Land	9.6	9.7 U	369 N
NK-SB-109	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	10.6	12.3 U	666 N
NK-SB-110	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	11.2	14.8 U	993 N
NK-SB-111	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	9.4	14.7 U	934 N
NK-SB-112	Brownish black (5YR 2/1) fine to med. sand	Made Land	Walpole Fine Sandy Loam	10.5	10.8 U	625 N
NK-SB-113	Dusky yell. brown (10YR 2/2) fine to coarse sand	Made Land	Made Land	9.3	14.6 U	659 N
NK-SB-114	Med. yell. brown (10YR 5/4) fine to coarse sand	Made Land	Made Land	13.8	11.5 U	283 N
NK-SB-115	Med. yell. brown (10YR 5/4) fine to coarse sand	Made Land	Made Land	14.3	11.0 U	342 N

Table 3
Metals Concentrations in Glaciolacustrine Sediments
Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut

Sample Information			Constituent				
Soil Boring ID	Sub-Area	Environmental Unit	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)
NA-SB-02	North Airport	Army Barracks	3.53	153	4.43	29.5	<28.6
NA-SB-13	North Airport	Pickle Company	4.09	138	<4.56	34.4	<30.4
NA-SB-16	North Airport	Pickle Company	5.9	188	5.69	37.1	<30
NK-SB-08	North Klondike	Ex. Storage Area	4.98	312	8.13	55.8	<30.1
NK-SB-09	North Klondike	Ex. Storage Area	1.87	34.3	<3.8	<6.33	<25.3
NK-SB-10	North Klondike	Ex. Storage Area	<1.24	48.4	<3.71	<6.19	<24.8
NK-SB-13	North Klondike	Ex. Storage Area	6.9	254	<4.82	48.2	<32.1
NK-SB-17	North Klondike	Ex. Storage Area	5.33	286	<4.57	48.2	<30.5
NK-SB-24	North Klondike	X-430	6.38	322	8.31	45.1	<30.8
NK-SB-26	North Klondike	X-415	9.6	338	7.74	54.8	<29.2
NK-SB-27	North Klondike	X-415	9.09	265	6.3	50.3	<30.7
NK-SB-27	North Klondike	X-415	9.84	295	7.98	54.3	<33.2
NK-SB-28	North Klondike	X-415	8.85	263	6.64	47.8	<33.2
NK-SB-29	North Klondike	X-415	7.62	286	6.21	51.1	<28.2
NK-SB-59	North Klondike	X-194	8.95	265	7.11	43.6	<31.6
NK-SB-232	North Klondike	X-407	7.94	259	6.25	50.1	<27.8
NK-SB-236	North Klondike	X-407	7.16	292	6.59	55.2	<30.6
NK-SB-333	North Klondike	X-407	<1.2	21.5	<0.12	6	2.2

Table 3
Metals Concentrations in Glaciolacustrine Sediments
Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut

Sample Information			Constituent				
Soil Boring ID	Sub-Area	Environmental Unit	Mercury (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Zinc (mg/kg)
NA-SB-02	North Airport	Army Barracks	<0.286	26.2	<1.43	<7.15	87.5
NA-SB-13	North Airport	Pickle Company	<0.304	21.8	<1.52	<7.61	84.4
NA-SB-16	North Airport	Pickle Company	<0.3	32.1	<1.5	<7.49	91.5
NK-SB-08	North Klondike	Ex. Storage Area	<0.301	52.7	<1.51	<7.53	130
NK-SB-09	North Klondike	Ex. Storage Area	<0.253	<12.7	<1.27	<6.33	13.7
NK-SB-10	North Klondike	Ex. Storage Area	<0.248	<12.4	<1.24	<6.19	14.1
NK-SB-13	North Klondike	Ex. Storage Area	<0.321	43.4	<1.61	<8.04	106
NK-SB-17	North Klondike	Ex. Storage Area	<0.305	43.1	<1.52	<7.62	107
NK-SB-24	North Klondike	X-430	<0.308	39.5	<1.54	<7.69	109
NK-SB-26	North Klondike	X-415	<0.292	52.4	<1.46	<7.3	129
NK-SB-27	North Klondike	X-415	<0.307	44.3	<1.54	<7.69	119
NK-SB-27	North Klondike	X-415	<0.332	44.2	<1.66	<8.31	131
NK-SB-28	North Klondike	X-415	<0.332	44.3	<1.66	<8.3	115
NK-SB-29	North Klondike	X-415	<0.282	46.3	<1.41	<7.06	116
NK-SB-59	North Klondike	X-194	<0.316	39	<1.58	<7.9	113
NK-SB-232	North Klondike	X-407	0.178	47.3	<1.39	<6.94	121
NK-SB-236	North Klondike	X-407	0.169	46.4	<1.53	<7.66	131
NK-SB-333	North Klondike	X-407	<0.18	8.5	<0.98	<3.7	<18.3

Table 4

**Statistical Analysis of Walpole Series Soils Metals Concentrations
Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut**

<i>Statistic</i>	<i>Aluminum</i>	<i>Arsenic</i>	<i>Barium</i>	<i>Beryllium</i>	<i>Cadmium</i>	<i>Chromium</i>	<i>Cobalt</i>	<i>Copper</i>	<i>Lead</i>	<i>Mercury</i>	<i>Nickel</i>
Mean	5788.57	4.28	10.81	0.16		6.06	2.27	5.07	10.93	0.07	4.29
Standard Error	887.81	2.63	1.29	0.02		0.43	0.16	0.24	2.22	0.02	0.89
Median	4860	1.7	10.4	0.16		6.1	2.2	5.2	13.8	0.03	4.3
Mode				0.21			2.2				
Standard Deviation	2348.93	6.95	3.41	0.05		1.14	0.39	0.63	5.87	0.06	2.35
Sample Variance		48.31	11.63	0.00		1.30	0.15	0.39	34.47	0.00	5.53
Kurtosis	-2.51	6.89	-0.50	-2.45		-0.66	0.42	1.01	-2.13		
Skewness	0.24	2.62	0.69	-0.05		-0.48	0.75	-0.48	-0.41		
Range	5400	19.05	9.6	0.11		3.2	1.1	2	13.9	0.135	6.1
Minimum	3220	0.95	6.8	0.1		4.2	1.8	4	3.5	0.025	2.1
Maximum	8620	20	16.4	0.21		7.4	2.9	6	17.4	0.16	8.2
Sum	40520	29.95	75.7	1.12		42.4	13.6	35.5	76.5	0.455	30.05
Count	7	7	7	7		7	6	7	7	7	7
Confidence Level (95.0%)	1740.08	5.15	2.53	0.04		0.84	0.31	0.46	4.35	0.05	1.74

Table 4

**Statistical Analysis of Walpole Series Soils Metals Concentrations
Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut**

<i>Statistic</i>	<i>Selenium</i>	<i>Silver</i>	<i>Sodium</i>	<i>Vanadium</i>	<i>Zinc</i>	<i>Silicon</i>
Mean	0.29		42.01	14.67	11.30	643.14
Standard Error	0.06		1.70	1.57	0.76	101.01
Median	0.19		43.7	15.5	10.6	659
Mode						
Standard Deviation	0.16		4.51	4.16	2.00	267.24
Sample Variance	0.03		20.32	17.35	4.00	71415.14
Kurtosis			-1.07	-1.78	-1.03	-1.08
Skewness			-0.07	-0.30	0.78	-0.08
Range	0.335		12.3	10.7	5	710
Minimum	0.165		36.3	8.7	9.3	283
Maximum	0.5		48.6	19.4	14.3	993
Sum	1.71		294.1	102.7	79.1	4502
Count	6		7	7	7	7
Confidence Level (95.0%)	0.13		3.34	3.09	1.48	197.97

Table 5

**Statistical Analysis of Made Land Soils Metals Concentrations
Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut**

<i>Statistic</i>	<i>Aluminum</i>	<i>Arsenic</i>	<i>Barium</i>	<i>Beryllium</i>	<i>Cadmium</i>	<i>Chromium</i>	<i>Cobalt</i>	<i>Copper</i>	<i>Lead</i>	<i>Mercury</i>	<i>Nickel</i>
Mean	5462.00	3.71	12.46	0.16	0.18	5.45	2.07	5.89	16.90	0.06	3.88
Standard Error	636.43	1.83	2.22	0.02	0.01	0.51	0.25	1.34	5.85	0.02	0.73
Median	4895	1.75	10.4	0.145	0.1675	5.8	2.2	5.25	13.3	0.03	2.55
Mode		1.7		0.21	0.16		2.2	5.3		0.03	
Standard Deviation	2012.57	5.78	6.66	0.07	0.03	1.63	0.75	4.25	18.49	0.05	2.19
Sample Variance		33.40	44.33	0.01	0.00	2.65	0.56	18.02	341.99	0.00	4.81
Kurtosis	-1.24	9.49	4.10	0.06	4.57	-0.55	-0.62	6.31	8.22	-0.45	0.31
Skewness	0.73	3.06	1.94	0.60	2.17	-0.68	-0.38	2.05	2.75	1.19	1.16
Range	5400	19.05	21.4	0.24	0.095	4.9	2.18	16.815	64.2	0.135	6.1
Minimum	3220	0.95	6.8	0.06	0.155	2.5	0.92	0.085	3.5	0.025	2.1
Maximum	8620	20	28.2	0.3	0.25	7.4	3.1	16.9	67.7	0.16	8.2
Sum	54620	37.05	112.1	1.61	1.765	54.5	18.62	58.885	169	0.63	34.95
Count	10	10	9	10	10	10	9	10	10	10	9
Confidence Level (95.0%)	1247.3793	3.5822113	4.3498714	0.0441608	0.0181906	1.0084228	0.490735	2.6313722	11.461779	0.0339224	1.4327503
95% Percentile Level	9151.27	14.30	24.84	0.29	0.23	8.43	3.47	13.67	50.80	0.16	7.96

Table 5

**Statistical Analysis of Made Land Soils Metals Concentrations
Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut**

<i>Statistic</i>	<i>Selenium</i>	<i>Silver</i>	<i>Sodium</i>	<i>Vanadium</i>	<i>Zinc</i>	<i>Silicon</i>
Mean	0.43	0.12	44.06	14.73	11.09	627.20
Standard Error	0.15	0.01	2.97	1.54	0.66	79.20
Median	0.28	0.125	43.7	16.55	10.55	642
Mode	0.185	0.125				
Standard Deviation	0.46	0.02	8.90	4.87	2.08	250.44
Sample Variance	0.21	0.00	79.26	23.74	4.34	62718.62
Kurtosis	7.08	-1.34	4.03	-1.19	-1.30	-1.27
Skewness	2.59	0.04	1.84	-0.60	0.60	0.09
Range	1.435	0.065	28.7	13.7	5.7	710
Minimum	0.165	0.085	36.3	6.4	8.6	283
Maximum	1.6	0.15	65	20.1	14.3	993
Sum	3.89	1.04	396.5	147.3	110.9	6272
Count	9	9	9	10	10	10
Confidence Level (95.0%)	0.2977052	0.0149199	5.8163046	3.0200153	1.2906839	155.21929
95% Percentile Level	1.28	0.16	60.61	23.66	14.91	1086.28

Table 6
Statistical Analysis of Glaciolacustrine Sediments Metals Concentrations
Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut

<i>Statistic</i>	<i>Arsenic</i>	<i>Barium</i>	<i>Cadmium</i>	<i>Chromium</i>	<i>Lead</i>	<i>Mercury</i>	<i>Nickel</i>	<i>Zinc</i>
Mean	6.07	223.34	5.12	39.88	14.21	0.15	35.78	95.96
Standard Error	0.70	24.00	0.62	4.24	0.76	0.00	3.64	9.66
Median	6.64	264.00	6.23	48.00	15.13	0.15	43.25	111.00
Mode		286.00		48.20	16.60	0.17	44.30	131.00
Standard Deviation	2.96	101.82	2.63	17.98	3.21	0.02	15.45	40.97
Sample Variance	8.77	10368.12	6.91	323.20	10.29	0.00	238.63	1678.82
Kurtosis	-0.63	-0.20	-1.17	0.59	12.95	3.55	-0.17	0.97
Skewness	-0.62	-1.05	-0.52	-1.37	-3.40	-1.54	-1.06	-1.49
Range	9.24	316.50	8.25	52.71	14.40	0.09	46.50	121.85
Minimum	0.60	21.50	0.06	3.10	2.20	0.09	6.20	9.15
Maximum	9.84	338.00	8.31	55.80	16.60	0.18	52.70	131.00
Sum	109.25	4020.20	92.17	717.76	255.75	2.68	644.05	1727.35
Count	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
Confidence Level (95.0%)	1.37	47.04	1.21	8.31	1.48	0.01	7.14	18.93
95% Percentile Level	10.70	373.05	9.17	65.19	17.71	0.18	58.40	152.44

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Table 7
Elemental Concentrations in Soils and Surficial Materials of the Conterminous United States
Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut

Constituent	CAS Number	Concentrations Detected in Soil (mg/kg)	
		Average	Observed Range
Aluminum (fume or dust)	7429-90-5	66,000	700 → 100,000
Antimony	7440-36-0	0.67	<1 → 8.8
Arsenic	7440-38-2	7.2	<0.1 → 97
Barium	7440-39-3	580	10 → 5,000
Beryllium	7440-41-7	0.92	<1 → 15
Boron (water soluble)	7440-42-8	34	<20 → 3000
Cadmium	7440-43-9	0.06	0.01 → 0.7
Calcium	7440-70-2	24,000	<150 → 320,000
Cerium	7440-45-1	86	<150 → 300
Chromium	7440-47-3	54	1.0 → 2,000
Cobalt	7440-48-4	10	<3 → 70
Copper	7440-50-8	25	<1 → 700
Gallium	7440-55-3	19	<5 → 70
Iron	7439-89-6	25,000	100 → 100,000
Lanthanum	7439-91-0	41	30 → 200
Lead	7439-92-1	19	<10 → 700
Manganese	7439-96-5	560	<1 → 7,000
Mercury	7439-97-6	0.089	<0.01 → 4.6
Molybdenum	7439-98-7	----	<3 → 7.0
Nickel	7440-02-0	19	<5 → 700
Phosphorus (white or yellow)	7723-14-0	420	20 → 6,000
Potassium	7440-09-7	23000	50 → 70,000
Selenium	7782-49-2	0.39	<0.1 → 4.3
Sodium	7440-23-5	12000	<500 → 100,000
Strontium	7440-24-6	240	<5 → 3,000
Vanadium (fume or dust)	7440-62-2	76	<7 → 500
Zinc (fume or dust)	7440-66-6	60	<5 → 2,900

Reference: Shacklette, H.T., and J.G. Boerngen, 1984, "Elemental Concentrations in Soils and Surficial Materials of the Conterminous U.S.," USGS Professional Paper 1270, U.S. government Printing Office, Washington, DC.

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ATTACHMENT A

Field Data Sheets

Soil Sampling Field Data Sheet

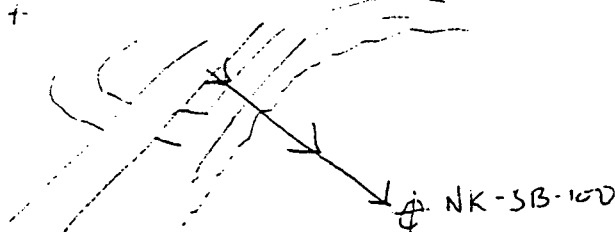


FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: <u>PRATT & WHITNEY EAST WETFOOD</u>	Project #: <u>93-ZZ149</u>
Project Location: <u>EAST WETFOOD CT</u>	Sampling Location <u>NK-5B-100</u>
Sample #: <u>10001145</u>	

Sample Location Info

At the culvert crossing airport road - cross stream and head due South east



Sample Data

Date: 12-17-93 Time: 1026
 Sampler: 3MT / SINS Weather: 400 SUN
 Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
 Trowel / Other Tongue depressor
 Field decon: Yes ☒ No ☐ Dedicated Sins
 Type of Sample: Grab / Composite /
 Other _____

Container	Quantity	Preservative
4oz Glass	1 ✓	ASIS

Description Data

Organic Vapor Reading: _____ Instrument: _____
 Sample Depth: Below organics Core Length: _____
 Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.)
 Munsell Color: Dusky Brown 5YR 2/2 Grain Size: FINE TO MED. SAND
 Sample Description Foreign Material: N/A
 Appearance: Dusky Brown FINE TO MED SAND

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: PCATT & WHITNEY

Project #: 93-22129

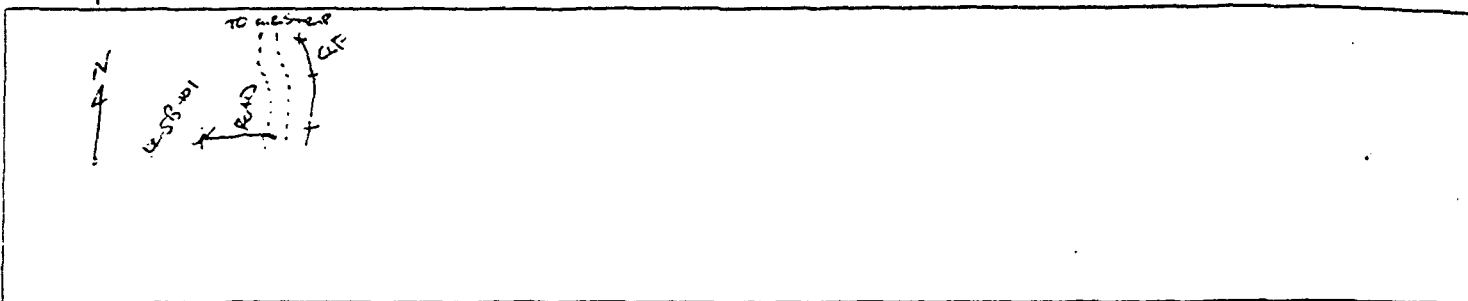
Project Location: EAST WATFORD, CT

Sampling Location

Sample #: 1000114W

NK-SB-101

Sample Location Info



Sample Data

Date: 12-17-93 Time: 1107
Sampler: 3MT / SMS Weather: 40° SN

Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
Trowel / Other TONGUE DEPRESSOR

Field decon: Yes / No Dedicated

Type of Sample: Grab / Composite /
Other _____

Container	Quantity	Preservative
<u>40Z. GLASS</u>	<u>1 ✓</u>	<u>ASIS</u>

Description Data

Organic Vapor Reading: _____

Instrument: _____

Sample Depth: BELOW ORIGIN

Core Length: _____

Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland B Horizon, Outwash, Etc.)

Munsell Color: ^{DRY}
DARK YELLOWISH BROWN
SMS 10 YR 2/2

Grain Size: FINE TO MED SAND

Sample Description Foreign Material: N/K

^{DRY}
Appearance: DARK YELLOWISH BROWN FINE TO MED SAND
SMS

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: POST 3 WHITNEY EAST WETPOND

Project #: 95-221A9

Project Location: EAST WETPOND, CT

Sampling Location

Sample #: 10001147

NK-SB-102

Sample Location Info

GO SOUTH PAST DEPRESSION, STATION INSIDE SURFACE WATER OR GO 20' AWAY AND FOLLOW PATH WITH PLYSTH

Sample Data

Date: 12-17-93 Time: 1040
 Sampler: JMT/SMS Weather: 400 SUN
 Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
 Trowel / Other TONGUE DEPRESSOR
 Field decon: Yes / No / Dedicated
 Type of Sample Grab / Composite /
 Other _____

Container	Quantity	Preservative
4 OZ. GLASS	1	AS IS

Description Data

Organic Vapor Reading: _____ Instrument: _____
 Sample Depth: Base of Pond Core Length: _____
 Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.)
 Munsell Color: DUSKY YELLOWISH BROWN 10YR 2/2 Grain Size: FINE TO MED SAND
 Sample Description Foreign Material: N/A
 Appearance: DUSKY YELLOWISH BROWN FINE TO MED SAND

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: PRATT & WHITNEY

Project #: 93-221A9

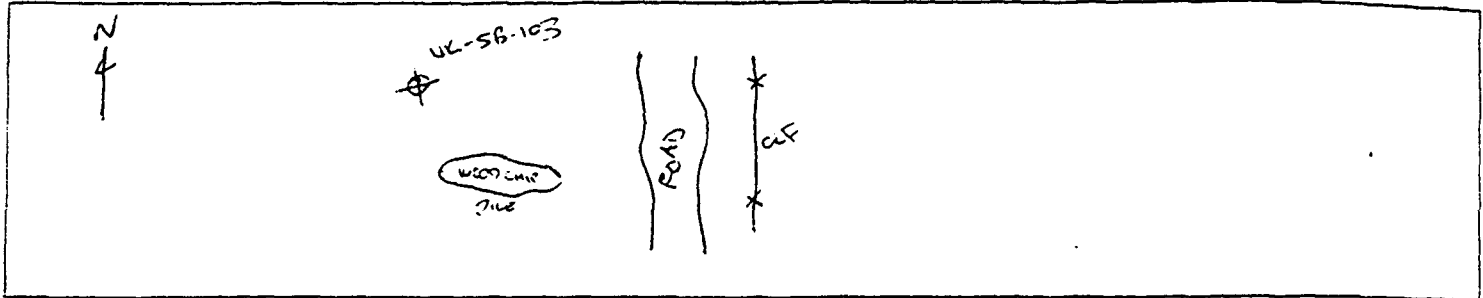
Project Location: EAST WATFORD, CT

Sampling Location

Sample #: 10001148-

NL-SB-103

Sample Location Info



Sample Data

Date: 12-17-93 Time: 1124
 Sampler: JMT / SMS Weather: 600 SUN
 Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
 Trowel / OTHER TORQUE DEPRESSOR
 Field decon: Yes / No / Dedicated
 Type of Sample: Grab / Composite /
 Other _____

Container	Quantity	Preservative
40Z. GLASS	1 ✓	ASIS

Description Data

Organic Vapor Reading: _____ Instrument: _____
 Sample Depth: BELOW DISBURSERS Core Length: _____
 Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland B Horizon, Outwash, Etc.)
 Munsell Color: DUSKY YELLOWISH BROWN 10YR 2/2 Grain Size: FINE TO MED SAND
 Sample Description Foreign Material: WOOD CHIPS
 Appearance: DUSKY YELLOW BROWN FINE TO MED SAND

Comments:



Project #: 93-221 A9

Sampling Location

Sample #: 10001149

NK-SB-104

FUSS & O'NEILL
Environmental
Field Services

NK-58-104

WATER CURE PILE

PICAO

X
X

CLF

Date: 12-17-93 Time: 1133
 Sampler: 3m / sn3 Weather: 40° SUN
 Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
 Trowel / Other toxic deposit
 Field decon: Yes / No / Dedicated
 Type of Sample: Grab / Composite /
Other

Container	Quantity	Preservative
40Z- CuASS	1	ASIS

Organic Vapor Reading: _____ Instrument: _____

Sample Depth: below organic Core Length: _____

Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.).

Munsell Color: DUSKY YELLOWISH BROWN 10YR 2/2 Grain Size: FINE TO MED SAND

Sample Description Foreign Material: N/A

Appearance: SEE ABOVE

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEIL
Environmental
Field Services

Client/Project Name: PRATT & WHITNEY

Project #: 93-ZZ1A9

Project Location: LAST WATFORD, CT

Sampling Location

Sample #: 100011SD

NL-5B-105 ✓

Sample Location Info

Sample Data

Date: 12-17-93 Time: 1147
Sampler: JMC/sms Weather: 400 SUN

Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
Trowel / Other TOUGH DEPRESSOR

Field decon: Yes / No / Dedicated

Type of Sample: Grab / Composite /
Other _____

Container	Quantity	Preservative
4 OZ. GLASS	1 ✓	AS.3

Description Data

Organic Vapor Reading: _____

Instrument: _____

Sample Depth: Below Obstacles

Core Length: _____

Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.)

Munsell Color: DUSK YELLOWISH BROWN
10 YR 2/2

Grain Size: FINE TO MED SAND

Sample Description Foreign Material: WOOD CHIPS

Appearance: SEE ABOVE

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: PEATT & WHITNEY

Project #: 93-221A9

Project Location: EAST HARTFORD

Sampling Location

Sample #: 10001151

NK-5B-106

Sample Location Info

(Hand-drawn sketch of a site map showing a road, a building, and a sampling point labeled NK-5B-106. A north arrow points upwards.)

Sample Data

Date: 12-17-93 Time: 1238
 Sampler: JMT/SMS Weather: 40° SUN
 Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
 Trowel / Other TONGUE DEPRESSOR
 Field decon: Yes / No / Dedicated
 Type of Sample: Grab / Composite /
 Other _____

Container	Quantity	Preservative
4 oz. GASS	✓	AS IS

Description Data

Organic Vapor Reading: _____

Instrument: _____

Sample Depth: BELOW OFFSHORE

Core Length: _____

Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.)

Munsell Color: DUSKY YELLOWISH BROWN
10 YR 2/2

Grain Size: FINE TO MED SAND

Sample Description Foreign Material: N/A

Appearance: SEE ABOVE

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: PRATT 3 WHITNEY

Project #: 93-EZ-1A9

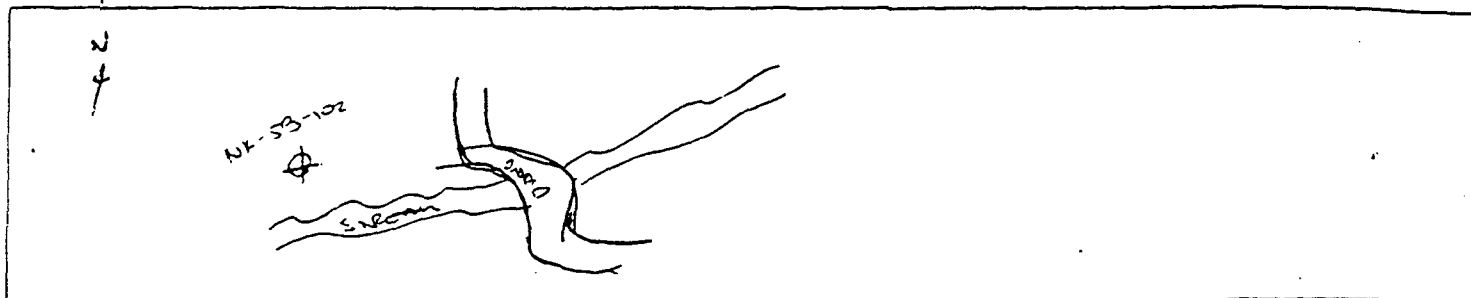
Project Location: EAST HARTFORD, CT

Sampling Location

NK-SB-107

Sample #: 1000152

Sample Location Info



Sample Data

Date: 12-17-93 Time: 1220
Sampler: JMT/SM Weather: 40° SUN

Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
Trowel / Other TAXIS DEPRESSOR

Field decon: Yes / No / Dedicated

Type of Sample Grab Composite /
Other _____

Container	Quantity	Preservative
4 oz. GLASS	1 ✓	AS IS

Description Data

Organic Vapor Reading: _____

Instrument: _____

Sample Depth: BELOW OFFICIALS

Core Length: _____

Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.)

Munsell Color: DUSKY YELLOWISH BROWN
10 YR 2/2

Grain Size: FINE TO MED SAND

Sample Description Foreign Material: N/A

Appearance: SEE ABOVE

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: PRATT & WHITNEY

Project #: 93-221 A7

Project Location: EAS. WATFORD CT

Sampling Location

Sample #: 10001153

NK-SB-108

Sample Location Info

N
f

POX-SB-108

Sample Data

Date: 12-17-93 Time: 3:10
Sampler: JMT / SMS Weather: 400 SUN

Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
Trowel / Other TRUCK DEPRESSOR

Field decon: Yes / No / Dedicated

Type of Sample: Grab Composite /
Other _____

Container	Quantity	Preservative
<u>42. GAS</u>	<u>1</u>	<u>AS IS</u>

Description Data

Organic Vapor Reading: _____

Instrument: _____

Sample Depth: BELOW ORGANICS

Core Length: _____

Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.)

Munsell Color: 10YR 10/2 YELLOWISH BROWN
10YR 2/2

Grain Size: FINE TO MED. SAND

Sample Description Foreign Material: N/A

Appearance: SEE ABOVE

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: TRITT & WHITNEY

Project #: 93-221A9

Project Location: EAST HARTFORD, CT

Sampling Location

Sample #: 10001154

NK-SB-109

Sample Location Info

[Handwritten sketch of a site map showing a dashed line and a point labeled NK-SB-109 (LOW RIDGE, NEAR SPOT)]

Sample Data

Date: 12-17-93 Time: 1440
Sampler: JMC / SMS Weather: 40° SUN

Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
Trowel / Other TONGUE DEPRESSOR

Field decon: Yes / No / Dedicated

Type of Sample: Grab / Composite /
Other _____

Container	Quantity	Preservative
<u>4 oz. GLASS</u>	<u>1 ✓</u>	<u>AS IS</u>

Description Data

Organic Vapor Reading: _____

Instrument: _____

Sample Depth: BELOW ORGANICS

Core Length: _____

Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.)

Munsell Color: BROWNISH BLACK 5YR 2/1

Grain Size: FINE TO MED SAND

Sample Description Foreign Material: N/A

Appearance: SEE ABOVE

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: PRATT & WHITNEY

Project #: 93-221A9

Project Location: EAST WATFORD, CT

Sampling Location

Sample #: 10001155

NK-SB-110

Sample Location Info

Sample Data

Date: 12-17-93 Time: 1445
Sampler: JMT/sm3 Weather: 400 SUN

Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
Trowel / Other TOMAX DEPRESSURE

Field decon: Yes / No / Dedicated

Type of Sample: Grab / Composite /
Other _____

Container	Quantity	Preservative
<u>4oz. glass</u>	<u>1</u> ✓	<u>AS IS</u>

Description Data

Organic Vapor Reading: —

Instrument: —

Sample Depth: BELOW ORGANICS

Core Length: —

Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.)

Munsell Color: BROWNISH BLACK STR 2/1

Grain Size: FINE TO MED SAND

Sample Description Foreign Material: N/A

Appearance: SEE ABOVE

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: PRATT & WHITNEY

Project #: 93-221A9

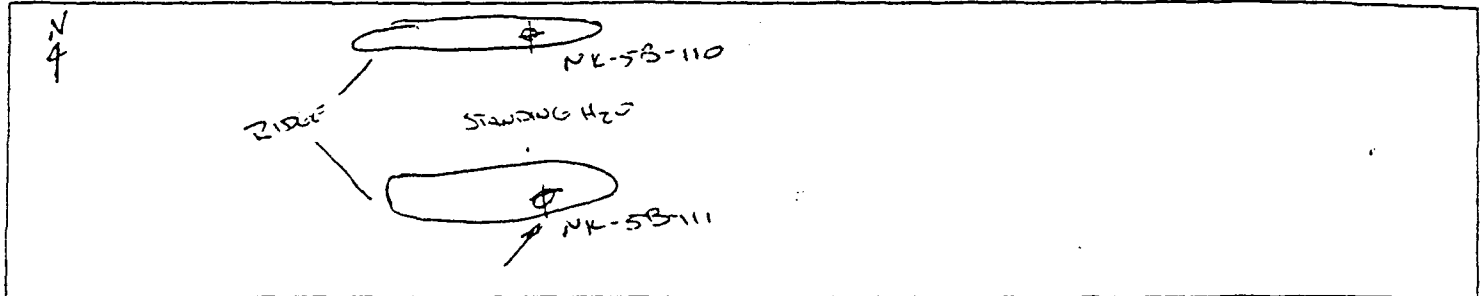
Project Location: EAST HARTFORD, CT

Sampling Location

Sample #: 10001157

NK-SB-111

Sample Location Info



Sample Data

Date: 12-17-93 Time: 1452
 Sampler: JMC / SMS Weather: 40° SUN
 Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
 Trowel / Other TAUQUE DEPRESSOR
 Field decon: Yes / No / Dedicated
 Type of Sample: Grab / Composite /
 Other _____

Container	Quantity	Preservative
<u>4 oz. GLASS</u>	<u>1</u>	<u>AS IS</u>

Description Data

Organic Vapor Reading: _____ Instrument: _____
 Sample Depth: BELOW ORGANICS Core Length: _____
 Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.)
 Munsell Color: BROWNISH BLACK STR 2/1 Grain Size: FINE TO MED. SAND
 Sample Description Foreign Material: N/A
 Appearance: SEE ABOVE

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: PENTT & WHITNEY

Project #: 93-221A-9

Project Location: EAST HARTFORD CT

Sampling Location

Sample #: 100011 SU

NK-SB-112

Sample Location Info

(Hand-drawn sketch of a site with a dashed line indicating a boundary and a point labeled NK-SB-112 in a wetland area.)

Sample Data

Date: 12-17-93 Time: 1501
Sampler: JMT / SMS Weather: 400 SUN

Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
Trowel / Other TONGUE DEPRESSOR

Field decon: Yes / No / Dedicated

Type of Sample: Grab / Composite /
Other _____

Container	Quantity	Preservative
4 oz. GUS	1 ✓	AS IS

Description Data

Organic Vapor Reading: _____

Instrument: _____

Sample Depth: BELOW ORGANICS

Core Length: _____

Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.)

Munsell Color: BROWNISH BLACK 5YR2/1

Grain Size: FINE TO MED SAND

Sample Description Foreign Material: N/A

Appearance: SEE ABOVE

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: PRATT & WHITNEY

Project #: 93-221A9

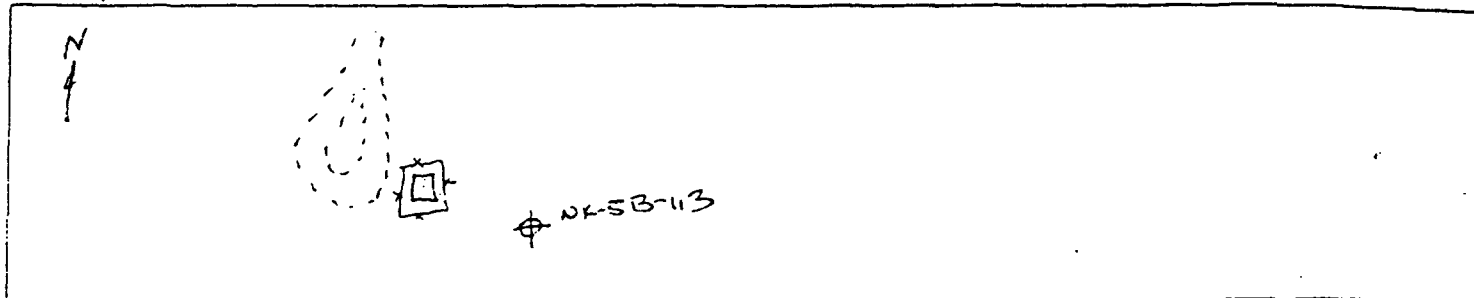
Project Location: EAST HARTFORD, CT

Sampling Location

Sample #: 100011SB

NK-SB-113

Sample Location Info



Sample Data

Date: 12-17-93 Time: 1425
 Sampler: SMT / SMTS Weather: LED SUN
 Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
 Trowel / Other TONGUE DEPRESSOR
 Field decon: Yes / No Dedicated
 Type of Sample: Grab / Composite /
 Other _____

Container	Quantity	Preservative
<u>4oz. GASS</u>	<u>1 ✓</u>	<u>ASIS</u>

Description Data

Organic Vapor Reading: _____ Instrument: _____
 Sample Depth: BELOW ORGANKS Core Length: _____
 Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.)
 Munsell Color: DUSK YELLOWISH BROWN Grain Size: FINE, MED. & COARSE SAND
10 YR 2/2
 Sample Description Foreign Material: N/A
 Appearance: SEE ABOVE

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: PRATT & WHITNEY

Project #: 93-221A9

Project Location: EAST HARTFORD, CT

Sampling Location

Sample #: 10001159

NK-SB-114

Sample Location Info

N
↑

10001159

⊕ NK-SB-114

Sample Data

Date: 12-17-93 Time: 1405
Sampler: 3m SMS Weather: 40° SUN

Container	Quantity	Preservative
4 G. OC. CANS	1 ✓	AS IS

Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
Trowel / Other TONGUE DEPRESSOR

Field decon: Yes / No / Dedicated

Type of Sample: Grab / Composite /
Other _____

Description Data

Organic Vapor Reading: _____

Instrument: _____

Sample Depth: BELOW OCEANIC

Core Length: _____

Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.)

Munsell Color: MET YELLOWISH BROWN
10 YR 5/4

Grain Size: FINE MET & COARSE SAND

Sample Description Foreign Material: N/A

Appearance: SEE ABOVE

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: PRATT & WHITNEY

Project #: 93-221A9

Project Location: EAST HARTFORD, CT

Sampling Location

Sample #: 10001160

NK-SB-115

Sample Location Info

[Hand-drawn sketch of a site with a circle and a crosshair]

[Handwritten: NK-SB-115]

Sample Data

Date: 12-17-93 Time: 1412
 Sampler: JMT / SMS Weather: 40° SUN
 Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
 Trowel / Other TONKAS DEPRESSOR
 Field decon: Yes / No / Dedicated
 Type of Sample: Grab / Composite /
 Other _____

Container	Quantity	Preservative
4oz. GLASS	1 ✓	ASIS

Description Data

Organic Vapor Reading: _____ Instrument: _____
 Sample Depth: BELOW ORGANICS Core Length: _____
 Sample Description: Sediment / Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.)
 Munsell Color: MOD. YELLOWISH BROWN Grain Size: FINE MOD. TO COARSE SAND
10YR 5/4
 Sample Description Foreign Material: N/A
 Appearance: _____

Comments:

Soil Sampling Field Data Sheet



FUSS & O'NEILL
Environmental
Field Services

Client/Project Name: PENTAGON

Project #: 93-221A9

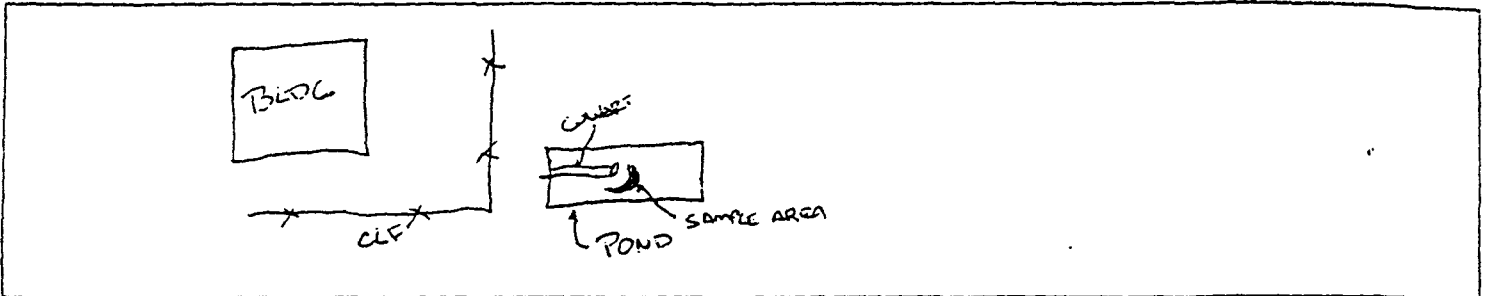
Project Location: EAST WATFORD, CT

Sampling Location

Sample #: 10001164

NK-WC-100

Sample Location Info



Sample Data

Date: 12-17-93 Time: 1350
Sampler: _____ Weather: 400 SUN

Sampling Device: Auger / Core Sampler / Shovel / Split Spoon
Trowel / Other SURFACE WATER SCOOP

Field decon: Yes / No / Dedicated

Type of Sample: Grab / Composite /
Other _____

Container

Quantity

Preservative

12 Amber

2 ✓

ASIS

Description Data

Organic Vapor Reading: _____

Instrument: _____

Sample Depth: BELOW ORGANICS

Core Length: _____

Sample Description: Sediment Soil Type (ex. Lacustrine, Wetland, B Horizon, Outwash, Etc.)

Munsell Color: BROWNISH BLACK STR 2/1

Grain Size: SAND FINE TO MED SAND

Sample Description Foreign Material: ORGANICS

Appearance: SEE ABOVE, SATURATED

Comments: AT END W/OUT IS RIP RAP NO SEDIMENT. SEE SKETCH FOR LOCATION.

DRAWINGS

**US EPA New England
RCRA Document Management System
Image Target Sheet**

RDMS Document ID # 2584

Facility Name: PRATT & WHITNEY - MAIN STREET

Facility ID#: CTD990672081

Phase Classification: R-1B

Purpose of Target Sheet:

☒ **Oversized (in Site File)** ☐ **Oversized (in Map Drawer)**

☐ **Page(s) Missing (Please Specify Below)**

☐ **Privileged** ☐ **Other (Provide Purpose Below)**

Description of Oversized Material, if applicable:

DRAWING TM4-1: BACKGROUND SOIL
INVESTIGATIONS, SOIL TYPE DISTRIBUTION

☒ **Map** ☐ **Photograph** ☐ **Other (Specify Below)**

**US EPA New England
RCRA Document Management System
Image Target Sheet**

RDMS Document ID # 2584

Facility Name: PRATT & WHITNEY - MAIN STREET

Facility ID#: CTD990672081

Phase Classification: R-1B

Purpose of Target Sheet:

☒ **Oversized (in Site File)** ☐ **Oversized (in Map Drawer)**

☐ **Page(s) Missing (Please Specify Below)**

☐ **Privileged** ☐ **Other (Provide Purpose Below)**

Description of Oversized Material, if applicable:

DRAWING TM4-2: BACKGROUND SOIL
INVESTIGATIONS, NORTH KLONDIKE AREA,
LOCATION & CONSTITUENTS DETECTED MAP

☒ **Map** ☐ **Photograph** ☐ **Other (Specify Below)**

*** Please Contact the EPA New England RCRA Records Center to View This Document ***

**US EPA New England
RCRA Document Management System
Image Target Sheet**

RDMS Document ID # 2584

Facility Name: PRATT & WHITNEY - MAIN STREET

Facility ID#: CTD990672081

Phase Classification: R-1B

Purpose of Target Sheet:

☒ **Oversized** (in Site File) ☐ **Oversized** (in Map Drawer)

☐ **Page(s) Missing** (Please Specify Below)

☐ **Privileged** ☐ **Other** (Provide
Purpose Below)

Description of Oversized Material, if applicable:

**DRAWING TM4-3: GLACIOLACUSTRINE SEDIMENT,
SAMPLING LOCATIONS, LOCATION & CONSTITUENTS
DETECTED MAP**

☒ **Map** ☐ **Photograph** ☐ **Other** (Specify Below)

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UNIT SPECIFIC TECHNICAL MEMORANDUM: X-410 SEPTIC SYSTEM PRATT & WHITNEY, EAST HARTFORD, CT

AREA: North Klondike

SUB-AREA: X-410

ENVIRONMENTAL UNIT: X-410 Maintenance and Storage Septic System

Location: In the North Klondike Area, second road south on North Access Road from Perimeter Road (Drawing 1).

Description: The former septic system consisted of a circular septic tank approximately 8 feet in diameter and 5 feet in depth, approximately 1,500 gallons in size, and a leaching field. The septic system serviced the Maintenance and Storage Building which was a 15 foot by 25 foot structure with a slab-on-grade foundation. Presently, only the foundation of this building remains. The septic tank has been removed. The specifics on the construction details for the septic tank and the leaching field were not available.

Dates of Operation: Approximately early 1960's to 1993.

Processes: Domestic sewage from the Maintenance and Storage Building.

Aerial Photographs: Large-scale aerial photographs for 1965, 1970, and 1975 were obtained from Keystone Aerial Surveys, Inc. Several small aerial photos were obtained from the Pratt & Whitney (P&W) Photographic Services Department. All of these aerial photos reveal that the Maintenance and Storage Building was an existing structure in the North Klondike from at least the date of the earliest photo, 1965.

Specific Contaminants of Concern: The specific contaminants are unknown. In order to be as comprehensive as possible in the investigation that was conducted, the following constituent groups were analyzed for: volatile organic compounds (VOCs), metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, nickel, and zinc), and polychlorinated biphenyls (PCBs).

Potential Release Mechanism: Impacts to soils and groundwater associated with potential leaks from the septic tank, and seepage from the leaching field.

INVESTIGATION AND REMEDIATION ACTIVITIES:

Due to the potential for a release associated with the septic system, subsurface investigations in the vicinity of the septic system were performed. These investigations were performed in July 1993 and August 1995. Prior to 1993, no investigation of this unit had reportedly been performed. On April 8, 1997 the septic system was removed.

An incidental investigation that involved a site-wide electromagnetic terrain conductivity survey was performed in early December 1989 by Westinghouse Environmental and Geotechnical Services, Inc. (Westinghouse). This survey was performed using a Geonics, Ltd. EM-31 terrain conductivity meter.

Conductivities measured along the rear of the Maintenance and Storage Building indicated an anomaly. Based on the inspection of the building, it appeared that the anomaly was a septic tank for the building (Westinghouse 1990). This was the first instance that the location of the septic tank was documented. No other sampling activities were conducted concurrently with this incidental investigation.

July 1993 Investigation (Metcalf & Eddy):

Description: In July 1993, Fuss & O'Neill, Inc. (F&O), working as a subcontractor for Metcalf & Eddy, Inc. (M&E), conducted a geophysical investigation to determine the location of the septic system. A Ground Penetrating Radar (GPR) survey was conducted and the septic tank was located. However, the leaching field was not located during the survey. M&E used a backhoe to excavate to the top of the septic tank and to remove the cover. A sludge sample, NK-SL-01, was collected from inside the tank on July 14, 1993 (M&E, 1993). This sample was analyzed for VOCs, metals (plus beryllium), and PCBs. A summary of the samples collected and analyses performed is included in Table 1.

Investigation Results: Concentrations of constituents detected in the septic tank sludge sample are presented in Table 4. A complete summary of sludge sample analytical results with detection limits is presented in Table 5. Acetone (ACT) was the only VOC detected in this sludge sample. Metals detected in the sludge sample included barium, lead, mercury, silver, and zinc. PCBs were not detected in this sample.

Data Evaluation and Conclusions: Based on the presence of ACT in the septic tank sludge sample, there is evidence that hazardous constituents may have been released to the septic system. Since only one sample was collected from within the septic tank and the leaching field was not located, additional investigation in the vicinity of the unit was warranted. No comparisons were made to the Connecticut Remediation Standard Regulation (RSR) for this sample, as there are no applicable criteria within the regulation for sludge samples.

August 1995 Investigation (Loureiro Engineering Associates):

Description: On August 8, 1995, one soil boring, NK-SB-03, was advanced within the approximate location of the leaching field by Loureiro Engineering Associates, P.C. (LEA). The sampling location is shown on Drawing 1. Soil samples were collected from the boring in continuous 2-foot intervals to a depth of 6 feet. In addition, another sample of the septic tank sludge (NK-SL-01) was collected on August 8, 1995.

A total of three soil samples from the soil boring were submitted to the LEA Analytical Laboratory and screened for the presence of target VOCs (benzene (BZ), ethylbenzene (EBZ), tetrachloroethylene (PCE), toluene (TL), 1,1,1-trichloroethane (TCA), trichloroethylene (TCE), and xylenes (XYL)). Based on visual, olfactory, or instrument evidence, and with consideration of the potential release mechanism, one sample from the soil boring was also submitted to Averill Environmental Laboratory, Inc. (AEL) for analysis. The sample was analyzed for the presence of VOCs, metals, and PCBs. The septic tank sludge sample was submitted to AEL and analyzed for the presence of VOCs, metals (without nickel and zinc), and PCBs. A summary of the samples collected and analyses performed is included in Table 1.

Investigation Results: Based on the boring log, groundwater was encountered between 4 and 6 feet below the ground surface. No visual or olfactory evidence of contamination was noted in the boring log for boring NK-SB-03.

Concentrations of constituents detected in soil samples collected for this unit are presented in Table 2. A complete summary of soil analytical results with detection limits is presented in Table 3. Detected concentrations at each soil sampling location are shown on Drawing 1. VOCs were not detected in the soil samples submitted to the LEA Analytical Laboratory or to AEL. PCBs were not detected in the soil sample submitted to AEL. Metals detected in the soil sample submitted to AEL included barium and chromium.

VOCs and PCBs were not detected in the septic tank sludge sample submitted to AEL. Metals detected in the sludge sample submitted to AEL included barium and mercury. Concentrations of constituents detected in septic tank sludge samples collected for this unit are presented in Table 4. A complete summary of sludge sample analytical results with detection limits is presented in Table 5.

Data Evaluation and Conclusions: The soil boring data were compared against the default numeric criteria included in the RSR and the site-wide background soil concentrations for various inorganic constituents (Fuss & O'Neill, 1994). For a more detailed discussion of background concentrations of metals in soil refer to *Technical Memorandum 4, Background Soil Data*. Criteria are established in the RSR based on exposure pathways for various environmental media, including soil and groundwater. The evaluation of the soils data is based on a comparison to the default numeric residential direct exposure criteria (RDEC), the industrial/commercial direct exposure criteria (IDEC), and the default numeric GB pollutant mobility criteria (GBPMC) included in the RSR.

Based on the analytical results for the soil samples from boring NK-SB-03 and the septic tank sludge sample NK-SL-01, there is no evidence that a release has occurred in the vicinity of this unit. The concentrations of the metals detected in the soil sample from boring NK-SB-03 are typical of background concentrations and are not indicative of a release from this unit. For the metals detected in soil, no exceedances of the default numeric RDEC or IDEC were noted. VOCs and PCBs were not detected in the soil sample collected and analyzed for this unit.

Based on the results of the laboratory analyses of soil samples collected and analyzed for this unit, there is no evidence that a release occurred from this unit. As a result, the area has been adequately characterized and no further action is warranted for this unit. No comparisons were made to the RSRs for the sludge sample, as there are no applicable criteria within the regulation for this type of media.

June 1997 Remediation (LEA):

Description: As part of the Septic System Removal Project conducted in the Airport/Klondike Area, the septic tank for the X-410 area was removed on April 8, 1997. The soil excavated with the tank removal was disposed of off the site as a non-hazardous waste. The excavation has been identified as test pit NK-TP-11. The location of the test pit is shown on Drawing 1.

A total of four sidewall samples were collected from each of the four excavation sidewalls of NK-TP-11 on April 15, 1997. These soil samples were submitted to Environmental Science Services

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Laboratory (ESS) for analysis. Due to data validation issues, analytical results from ESS were deemed unusable for the Airport/Klondike Project. Subsequent to these concerns, ESS analytical results have not be considered within this Unit Specific Technical Memorandum.

The four confirmational sidewall samples were recollected from each of the four excavation sidewalls of NK-TP-11 on June 9, 1997. These soil samples were submitted to Quanterra Inc. (QNT) for analysis of VOCs by EPA Method 8260, metals, and TPH by EPA Method 418.1. A summary of samples collected and analyses performed are included in Table 1.

Investigation Results: No visual or olfactory evidence of contamination was noted in the field paperwork. Concentrations of constituents detected in soil samples collected for this unit are presented in Table 2. A complete summary of soil analytical results with detection limits is presented in Table 3. Detected concentrations at each sampling location are shown on Drawing 1.

VOCs and TPH were not detected in the soil samples submitted to QNT for analysis. One or more of the metals analyzed were detected in each of the soil samples submitted for analysis. These metals include arsenic, barium, chromium, lead, nickel, and zinc.

Data Evaluation and Conclusions: The soil data were compared against the default numeric criteria included in the RSRs and the site-specific background soil concentrations for various inorganic constituents for the North Klondike (Fuss & O'Neill, 1994). The concentrations of the metals detected in the soil samples are typical of background concentrations and are not indicative of a release from this unit. For the metals detected in soil, no exceedances of the default numeric RDEC or IDEC were noted.

VOCs and TPH were not detected in the soil samples collected and analyzed for this unit. Based on the results of the laboratory analyses of soil samples collected and analyzed for this unit, there is no evidence that a release occurred from this unit. As a result, the area has been adequately characterized and no further action is warranted for this unit.

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Westinghouse Environmental and Geotechnical Services, Inc. 1990, *Preliminary Reconnaissance Survey of the Klondike Area*, Pratt & Whitney, East Hartford, Connecticut, unpublished report for Pratt & Whitney.

As K about
validation issues

TABLES

DRAFT

Page 1 of 1

[illegible]

Notes: 1. Legend: X - Analysed; at least one analyte over the detection limit; x - Analysed, no analytes in group over the detection limit

2. Printed on 05/18/98

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Page 1 of 1

[illegible]

Notes: 1. Only Detects Shown
2. Printed on 05/13/98

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: X-410 Septic System Area

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Page 1 of 8

	Location ID	NK-SB-03	NK-SB-03	NK-SB-03	NK-SB-03	NK-TP-11E	NK-TP-11N	NK-TP-11S
	Sample ID	1006259	1006260	1006261	1006261	1635146	1635144	1635145
	Sample Date	08/08/1995	08/08/1995	08/08/1995	08/08/1995	06/09/1997	06/09/1997	06/09/1997
	Sample Time	10:10	10:00	10:15	10:15	09:40	09:35	09:37
	Sample Depth	0' - 2'	2' - 4'	4' - 6'	4' - 6'			
	Laboratory	LEA	LEA	AEL	LEA	QUAN	QUAN	QUAN
	Lab. Number	95-00199-452	95-00200-453	AEL95008788	95-00201-454	A7F100149037	A7F100149035	A7F100149036
Constituent	Units							
Date Metals Analyzed	-			08/16/1995		06/27/1997	06/27/1997	06/27/1997
Date Organics Analyzed	-	08/09/1995	08/09/1995	08/18/1995	08/09/1995	06/21/1997	06/21/1997	06/21/1997
Date PCBs Analyzed	-			08/22/1995				
Arsenic	mg/kg			<1.21		<1.1 U	1.1	<1.1 U
Barium	mg/kg			43.2		33.6	20.3	21.4
Cadmium	mg/kg			<3.63		<0.11 U	<0.11 U	<0.11 U
Chromium	mg/kg			6.66		6.8	7.2	7.4
Lead	mg/kg			<24.2		4.8	5.5	9.4
Mercury	mg/kg			<0.242		<0.16 U	<0.16 U	<0.17 U
Nickel	mg/kg					6.8	6.2	7.1
Selenium	mg/kg			<1.21		<0.86 U	<0.86 U	<0.88 U
Silver	mg/kg			<6.06		<3.2 U	<3.2 U	<3.3 U
Zinc	mg/kg					20.0	17.5	23.2
PCB 1016	µg/kg			<240				
PCB 1221	µg/kg			<240				
PCB 1232	µg/kg			<240				
PCB 1242	µg/kg			<240				
PCB 1248	µg/kg			<240				
PCB 1254	µg/kg			<240				
PCB 1260	µg/kg			<240				
Dibromo-3-chloropropane, 1,2-	µg/kg					<5.4 U	<5.4 U	<5.5 U
Total Petroleum Hydrocarbons	mg/kg					<54 U	<54 U	<55 U
Dichloro-2-butylene, 1,4-trans-	µg/kg					<5.4 U	<5.4 U	<5.5 U
Acetone	µg/kg			<30		<110 U	<110 U	<110 U
Acetonitrile	µg/kg					<54 U	<54 U	<55 U
Acrolein	µg/kg			<15		<54 U	<54 U	<55 U
Acrylonitrile	µg/kg			<15		<110 U	<110 U	<110 U
Allyl Chloride	µg/kg					<110 U	<110 U	<110 U

Notes: 1. Printed on 05/13/98

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: X-410 Septic System Area

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Page 2 of 8

	Location ID	NK-SB-03	NK-SB-03	NK-SB-03	NK-SB-03	NK-TP-11E	NK-TP-11N	NK-TP-11S
	Sample ID	1006259	1006260	1006261	1006261	1635146	1635144	1635145
	Sample Date	08/08/1995	08/08/1995	08/08/1995	08/08/1995	06/09/1997	06/09/1997	06/09/1997
	Sample Time	10:10	10:00	10:15	10:15	09:40	09:35	09:37
	Sample Depth	0' - 2'	2' - 4'	4' - 6'	4' - 6'			
	Laboratory	LEA	LEA	AEL	LEA	QUAN	QUAN	QUAN
	Lab. Number	95-00199-452	95-00200-453	AEL95008788	95-00201-454	A7F100149037	A7F100149035	A7F100149036
Constituent	Units							
Benzene	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Benzene (screening)	µg/kg	<3	<3		<3			
Bromobenzene	µg/kg			<6.1				
Bromoform	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Carbon Disulfide	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Carbon Tetrachloride	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Chlorobenzene	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Chlorodibromomethane	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Chloroethane	µg/kg			<6.1		<11 U	<11 U	<11 U
Chloroethyl Vinyl Ether,2-	µg/kg			<6.1				
Chloroform	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Chloroprene,beta-	µg/kg					<5.4 U	<5.4 U	<5.5 U
Chlorotoluene,o-	µg/kg			<6.1				
Chlorotoluene,p-	µg/kg			<6.1				
Dibromomethane	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Dichlorobenzene,1,2-	µg/kg			<6.1				
Dichlorobenzene,1,3-	µg/kg			<6.1				
Dichlorobenzene,1,4-	µg/kg			<6.1				
Dichlorobromomethane	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Dichlorodifluoromethane	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Dichloroethane,1,1-	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Dichloroethane,1,2-	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Dichloroethylene,1,1-	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Dichloroethylene,1,2-cis-	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Dichloroethylene,1,2-trans-	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Dichloropropane,1,2-	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Dichloropropylene,1,3-	µg/kg					<5.4 U	<5.4 U	<5.5 U
Dichloropropylene,1,3-cis-	µg/kg			<6.1				

Notes: 1. Printed on 05/13/98

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: X-410 Septic System Area

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	Location ID	NK-SB-03	NK-SB-03	NK-SB-03	NK-SB-03	NK-TP-11E	NK-TP-11N	NK-TP-11S
	Sample ID	1006259	1006260	1006261	1006261	1635146	1635144	1635145
	Sample Date	08/08/1995	08/08/1995	08/08/1995	08/08/1995	06/09/1997	06/09/1997	06/09/1997
	Sample Time	10:10	10:00	10:15	10:15	09:40	09:35	09:37
	Sample Depth	0' - 2'	2' - 4'	4' - 6'	4' - 6'			
	Laboratory	LEA	LEA	AEL	LEA	QUAN	QUAN	QUAN
	Lab. Number	95-00199-452	95-00200-453	AEL95008788	95-00201-454	A7F100149037	A7F100149035	A7F100149036
Constituent	Units							
Dichloropropylene,1,3-trans-	µg/kg			<6.1				
Dioxane,1,4-	µg/kg					<160 U	<160 U	<170 U
Ethyl Methacrylate	µg/kg					<5.4 U	<5.4 U	<5.5 U
Ethylbenzene	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Ethylbenzene (screening)	µg/kg	<4	<4		<5			
Ethylene Dibromide	µg/kg					<5.4 U	<5.4 U	<5.5 U
Hexanone,2-	µg/kg			<15		<54 U	<54 U	<55 U
Iodomethane	µg/kg					<5.4 U	<5.4 U	<5.5 U
Isobutyl Alcohol	µg/kg					<54 U	<54 U	<55 U
Methacrylonitrile	µg/kg					<5.4 U	<5.4 U	<5.5 U
Methyl Bromide	µg/kg			<6.1		<11 U	<11 U	<11 U
Methyl Chloride	µg/kg			<6.1		<11 U	<11 U	<11 U
Methyl Ethyl Ketone	µg/kg			<15		<110 U	<110 U	<110 U
Methyl Methacrylate	µg/kg					<5.4 U	<5.4 U	<5.5 U
Methyl-2-pentanone,4-	µg/kg			<15		<11 U	<11 U	<11 U
Methyl-tert-butyl Ether	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Methylene Chloride	µg/kg			<15		<5.4 U	<5.4 U	<5.5 U
Propionitrile	µg/kg					<21 U	<22 U	<22 U
Styrene	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Tetrachloroethane,1,1,1,2-	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Tetrachloroethane,1,1,2,2-	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Tetrachloroethylene	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Tetrachloroethylene (screening)	µg/kg	<5	<4		<5			
Toluene	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Toluene (screening)	µg/kg	<4	<4		<5			
Trichloroethane,1,1,1-	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U
Trichloroethane,1,1,1- (screening)	µg/kg	<8	<7		<8			
Trichloroethane,1,1,2-	µg/kg			<6.1		<5.4 U	<5.4 U	<5.5 U

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: X-410 Septic System Area

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	Location ID	NK-TP-11W						
	Sample ID	1635147						
	Sample Date	06/09/1997						
	Sample Time	09:42						
	Sample Depth							
	Laboratory	QUAN						
	Lab. Number	A7F100149038						
Constituent	Units							
Date Metals Analyzed	-	06/27/1997						
Date Organics Analyzed	-	06/21/1997						
Date PCBs Analyzed	-							
Arsenic	mg/kg	<1.1 U						
Barium	mg/kg	<16.4 U						
Cadmium	mg/kg	<0.11 U						
Chromium	mg/kg	5.5						
Lead	mg/kg	2.2						
Mercury	mg/kg	<0.16 U						
Nickel	mg/kg	6.0						
Selenium	mg/kg	<0.87 U						
Silver	mg/kg	<3.3 U						
Zinc	mg/kg	<16.4 U						
PCB 1016	µg/kg							
PCB 1221	µg/kg							
PCB 1232	µg/kg							
PCB 1242	µg/kg							
PCB 1248	µg/kg							
PCB 1254	µg/kg							
PCB 1260	µg/kg							
Dibromo-3-chloropropane, 1,2-	µg/kg	<5.5 U						
Total Petroleum Hydrocarbons	mg/kg	<55 U						
Dichloro-2-butylene, 1,4-trans-	µg/kg	<5.5 U						
Acetone	µg/kg	<110 U						
Acetonitrile	µg/kg	<55 U						
Acrolein	µg/kg	<55 U						
Acrylonitrile	µg/kg	<110 U						
Allyl Chloride	µg/kg	<110 U						

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: X-410 Septic System Area

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	Location ID	NK-TP-11W					
	Sample ID	1635147					
	Sample Date	06/09/1997					
	Sample Time	09:42					
	Sample Depth						
	Laboratory	QUAN					
	Lab. Number	A7F100149038					
Constituent	Units						
Benzene	µg/kg	<5.5 U					
Benzene (screening)	µg/kg						
Bromobenzene	µg/kg						
Bromoform	µg/kg	<5.5 U					
Carbon Disulfide	µg/kg	<5.5 U					
Carbon Tetrachloride	µg/kg	<5.5 U					
Chlorobenzene	µg/kg	<5.5 U					
Chlorodibromomethane	µg/kg	<5.5 U					
Chloroethane	µg/kg	<11 U					
Chloroethyl Vinyl Ether,2-	µg/kg						
Chloroform	µg/kg	<5.5 U					
Chloroprene,beta-	µg/kg	<5.5 U					
Chlorotoluene,o-	µg/kg						
Chlorotoluene,p-	µg/kg						
Dibromomethane	µg/kg	<5.5 U					
Dichlorobenzene,1,2-	µg/kg						
Dichlorobenzene,1,3-	µg/kg						
Dichlorobenzene,1,4-	µg/kg						
Dichlorobromomethane	µg/kg	<5.5 U					
Dichlorodifluoromethane	µg/kg	<5.5 U					
Dichloroethane,1,1-	µg/kg	<5.5 U					
Dichloroethane,1,2-	µg/kg	<5.5 U					
Dichloroethylene,1,1-	µg/kg	<5.5 U					
Dichloroethylene,1,2-cis-	µg/kg	<5.5 U					
Dichloroethylene,1,2-trans-	µg/kg	<5.5 U					
Dichloropropane,1,2-	µg/kg	<5.5 U					
Dichloropropylene,1,3-	µg/kg	<5.5 U					
Dichloropropylene,1,3-cis-	µg/kg						

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: X-410 Septic System Area

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	Location ID	NK-TP-11W					
	Sample ID	1635147					
	Sample Date	06/09/1997					
	Sample Time	09:42					
	Sample Depth						
	Laboratory	QUAN					
	Lab. Number	A7F100149038					
Constituent	Units						
Dichloropropylene,1,3-trans-	µg/kg						
Dioxane,1,4-	µg/kg	<160 U					
Ethyl Methacrylate	µg/kg	<5.5 U					
Ethylbenzene	µg/kg	<5.5 U					
Ethylbenzene (screening)	µg/kg						
Ethylene Dibromide	µg/kg	<5.5 U					
Hexanone,2-	µg/kg	<55 U					
Iodomethane	µg/kg	<5.5 U					
Isobutyl Alcohol	µg/kg	<55 U					
Methacrylonitrile	µg/kg	<5.5 U					
Methyl Bromide	µg/kg	<11 U					
Methyl Chloride	µg/kg	<11 U					
Methyl Ethyl Ketone	µg/kg	<110 U					
Methyl Methacrylate	µg/kg	<5.5 U					
Methyl-2-pentanone,4-	µg/kg	<11 U					
Methyl-tert-butyl Ether	µg/kg	<5.5 U					
Methylene Chloride	µg/kg	<5.5 U					
Propionitrile	µg/kg	<22 U					
Styrene	µg/kg	<5.5 U					
Tetrachloroethane,1,1,1,2-	µg/kg	<5.5 U					
Tetrachloroethane,1,1,2,2-	µg/kg	<5.5 U					
Tetrachloroethylene	µg/kg	<5.5 U					
Tetrachloroethylene (screening)	µg/kg						
Toluene	µg/kg	<5.5 U					
Toluene (screening)	µg/kg						
Trichloroethane,1,1,1-	µg/kg	<5.5 U					
Trichloroethane,1,1,1- (screening)	µg/kg						
Trichloroethane,1,1,2-	µg/kg	<5.5 U					

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Table 5
SUMMARY OF ANALYTICAL RESULTS - SLUDGE
P&W East Hartford: X-410 Septic System Area

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	Location ID	NK-SL-01	NK-SL-01					
	Sample ID	01017071493	1006169					
	Sample Date	07/14/1993	08/02/1995					
	Sample Time		14:45					
	Laboratory	ENS	AEL					
	Lab. Number	0294100002SA	AEL95008563					
Constituent	Units							
Date Metals Analyzed	-	07/19/1993	08/11/1995					
Date Organics Analyzed	-	07/19/1993	08/08/1995					
Date PCBs Analyzed	-	07/20/1993	08/21/1995					
Arsenic	mg/kg	<1.7	<24.4					
Barium	mg/kg	70.7	227					
Beryllium	mg/kg	<0.69						
Cadmium	mg/kg	<1.7	<73.2					
Chromium	mg/kg		<122					
Chromium (Total)	mg/kg	<3.4						
Lead	mg/kg	9.0	<488					
Mercury	mg/kg	4.7	5.56					
Nickel	mg/kg	<6.9						
Selenium	mg/kg	<1.7	<24.4					
Silver	mg/kg	5.6	<122					
Zinc	mg/kg	384						
PCB 1016	µg/kg	<140	<16000					
PCB 1221	µg/kg	<140	<16000					
PCB 1232	µg/kg	<140	<16000					
PCB 1242	µg/kg	<140	<16000					
PCB 1248	µg/kg	<140	<16000					
PCB 1254	µg/kg	<140	<16000					
PCB 1260	µg/kg	<140	<16000					
Acetone	µg/kg	6300	<2400					
Acrolein	µg/kg		<1200					
Acrylonitrile	µg/kg		<1200					
Benzene	µg/kg	<86	<480					
Bromobenzene	µg/kg		<480					
Bromoform	µg/kg	<86	<480					
Carbon Disulfide	µg/kg	<86	<480 N1					

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Table 5
SUMMARY OF ANALYTICAL RESULTS - SLUDGE
P&W East Hartford: X-410 Septic System Area

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	Location ID	NK-SL-01	NK-SL-01				
	Sample ID	01017071493	1006169				
	Sample Date	07/14/1993	08/02/1995				
	Sample Time		14:45				
	Laboratory	ENS	AEL				
	Lab. Number	0294100002SA	AEL95008563				
Constituent	Units						
Carbon Tetrachloride	µg/kg	<86	<480				
Chlorobenzene	µg/kg	<86	<480				
Chlorodibromomethane	µg/kg	<86	<480				
Chloroethane	µg/kg	<170	<480				
Chloroethyl Vinyl Ether,2-	µg/kg		<480				
Chloroform	µg/kg	<86	<480				
Chlorotoluene,o-	µg/kg		<480				
Chlorotoluene,p-	µg/kg		<480				
Dibromomethane	µg/kg		<480				
Dichlorobenzene,1,2-	µg/kg		<480				
Dichlorobenzene,1,3-	µg/kg		<480				
Dichlorobenzene,1,4-	µg/kg		<480				
Dichlorobromomethane	µg/kg	<86	<480				
Dichlorodifluoromethane	µg/kg		<480				
Dichloroethane,1,1-	µg/kg	<86	<480				
Dichloroethane,1,2-	µg/kg	<86	<480				
Dichloroethylene,1,1-	µg/kg	<86	<480				
Dichloroethylene,1,2-	µg/kg	<86					
Dichloroethylene,1,2-cis-	µg/kg		<480				
Dichloroethylene,1,2-trans-	µg/kg		<480				
Dichloropropane,1,2-	µg/kg	<86	<480				
Dichloropropylene,1,3-cis-	µg/kg	<86	<480				
Dichloropropylene,1,3-trans-	µg/kg	<86	<480				
Ethylbenzene	µg/kg	<86	<480				
Hexanone,2-	µg/kg	<170	<1200				
Methyl Bromide	µg/kg	<170	<480				
Methyl Chloride	µg/kg	<170	<480				
Methyl Ethyl Ketone	µg/kg	<170	<1200				
Methyl-2-pentanone,4-	µg/kg	<170	<1200				

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DRAWINGS

**US EPA New England
RCRA Document Management System
Image Target Sheet**

RDMS Document ID # 2584

Facility Name: PRATT & WHITNEY - MAIN STREET

Facility ID#: CTD990672081

Phase Classification: R-1B

Purpose of Target Sheet:

☒ **Oversized (in Site File)** ☐ **Oversized (in Map Drawer)**

☐ **Page(s) Missing (Please Specify Below)**

☐ **Privileged** ☐ **Other (Provide Purpose Below)**

Description of Oversized Material, if applicable:

DRAWING 1 : SOIL INVESTIGATIONS, X-410
SEPTIC SYSTEM, LOCATION & CONSTITUENTS
DETECTED MAP

☒ **Map** ☐ **Photograph** ☐ **Other (Specify Below)**

*** Please Contact the EPA New England RCRA Records Center to View This Document ***

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UNIT-SPECIFIC TECHNICAL MEMORANDUM: UNDEVELOPED LAND DEBRIS PILE

PRATT & WHITNEY, EAST HARTFORD, CT

AREA: South Klondike

SUB-AREA: Undeveloped Land

ENVIRONMENTAL UNIT: Debris Pile

Location: South Klondike Area, south of a dirt road from Linde Road. This area is bounded on the west and south by wooded undeveloped land (Drawing 1).

Description: This unit consists of a large pile of landscaping debris. The surface of the pile was observed to contain predominantly grass clippings, wood chips, branches, trimmings, mulch, and black plastic landscaping edging. The source for the debris is unknown.

Dates of Operation: Unknown.

Processes: Placement of landscaping debris.

Aerial Photographs: Large-scale aerial photographs for 1965, 1970, and 1975 were obtained from Keystone Aerial Surveys, Inc. A review of these aerial photographs provided no information on the debris pile. No readily apparent debris or distinguishing characteristics are discernible from the aerial photos.

Specific Contaminants of Concern: The specific contaminants of concern are unknown. In order to be as comprehensive as possible in the investigation that was conducted, the following constituent groups were analyzed. These analyses included volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals (arsenic, barium, cadmium, chromium, mercury, nickel, selenium, silver, and zinc), polychlorinated biphenyls (PCBs), and total petroleum hydrocarbons (TPH).

Potential Release Mechanism: Impacts to soils and groundwater associated with potential spills, leaks, or materials leaching from the debris pile.

INVESTIGATION AND REMEDIATION ACTIVITIES:

Due to the potential for a release associated with the debris pile, a subsurface investigation to determine the degree of soil contamination was performed in February 1997. Prior to 1997 no investigation of the debris pile had reportedly been performed.

February 1997 Investigation (Loureiro Engineering Associates):

Description: On February 6 and 7, 1997, two soil borings, SK-SB-130 and SK-SB-131, were advanced in the vicinity of the debris pile by Loureiro Engineering Associates, P.C. (LEA). The sampling locations are shown on Drawing 1. Soil samples were collected from each boring in

continuous two-foot intervals to a depth of sixteen feet. The depth of the borings was selected to ensure that sufficient data were collected for comparisons against direct exposure criteria in the Connecticut Remediation Standard Regulation (RSR).

A total of sixteen soil samples from the soil borings were submitted to the LEA Analytical Laboratory and screened for the presence of target VOCs (benzene (BZ), ethylbenzene (EBZ), tetrachloroethylene (PCE), toluene (TL), 1,1,1-trichloroethane (TCA), trichloroethylene (TCE), and xylenes (XYL)). Based on visual, olfactory, or instrument evidence, and with consideration of the potential release mechanism, two samples from each boring were submitted to Averill Environmental Laboratory, Inc. (AEL) and analyzed for the presence of VOCs, metals, TPH, and PCBs. In addition, one soil sample from each boring was also analyzed for the presence of SVOCs.

Groundwater samples were also collected from both borings using Geoprobe[®] screenpoint groundwater sampling techniques. The groundwater samples were collected from a depth of nine to eleven feet below the ground surface. The groundwater samples were submitted to AEL for analysis of VOCs, SVOCs, metals, TPH, and PCBs. A summary of the samples collected and analyses performed is included in Table 1.

Investigation Results: Based on the boring logs, groundwater was encountered at approximately five feet in both borings. Varved clay was not encountered in either boring. No visual or olfactory evidence of contamination was noted in the boring logs.

Concentrations of constituents detected in soil samples collected for this unit are presented in Table 2. A complete summary of soil analytical results with detection limits is presented in Table 3. Detected concentrations are shown on Drawing 1. VOCs were not detected in the soil samples submitted to the LEA Analytical Laboratory or to AEL. Additionally, SVOCs, TPH, and PCBs were not detected in the soil samples submitted to AEL. However, fluoranthene (FA) was noted as "N1" in boring SK-SB-131 at 0 to 2 feet. The "N1" qualifier indicates that it was noted above the method detection limit, but below the reportable quantitation limit.

One or more of the metals analyzed were detected in each of the soil samples submitted for analysis. These metals include arsenic, barium, chromium, and zinc.

Concentrations of constituents detected in Geoprobe[®] screenpoint groundwater samples collected for this unit are presented in Table 4. A complete summary of groundwater analytical results with detection limits is presented in Table 5. VOCs, SVOCs, TPH, and PCBs were not detected in the groundwater samples submitted to AEL for analysis. Barium and mercury were detected in the Geoprobe[®] screenpoint groundwater sample from SK-SB-130. No other metals were detected in the groundwater samples submitted to AEL.

Data Evaluation and Conclusions: The soil boring data were compared against the default numeric criteria included in the RSR and the site-wide background soil concentrations for the North Klondike for various inorganic constituents (Fuss & O'Neill, 1994). For a more detailed discussion of background concentrations of metals in soil refer to *Technical Memorandum 4, Background Soil Data*. Criteria are established in the RSR based on exposure pathways for

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various environmental media, including soil and groundwater. The evaluation of the soils data is based on a comparison to the residential direct exposure criteria (RDEC), the industrial/commercial direct exposure criteria, (IDEC) and the GB pollutant mobility criteria (GBPMC) included in the RSR.

The concentrations of the metals detected in the soil samples are typical of site-wide background concentrations, and are not indicative of a release from this unit. For the metals detected in soil, no exceedances of the default numeric RDEC or IDEC were noted. VOCs, SVOCs, TPH, and PCBs were not detected in either the soil samples or the groundwater samples collected and analyzed for this unit. Based on the results of the laboratory analyses of soil samples collected and analyzed for this unit, there is no evidence that a release occurred from this unit. As a result, the area has been adequately characterized and no further action is warranted for this unit.

Although an elevated concentration of mercury was detected in one of the groundwater samples collected and analyzed for this unit, the metals in the groundwater are believed to be natural. For a more detailed account of the groundwater sampling, including background concentrations for metals in groundwater, refer to *Technical Memorandum 3, Groundwater Sampling and Quality*.

REFERENCES:

Fuss & O'Neill, Inc., 1994, *Soil Sampling Background Areas – North Klondike*, prepared for Pratt & Whitney.

Keystone Aerial Surveys, Inc., 1965, *Aerial Photo of Rentschler Airport and Surrounding Areas*, East Hartford, CT.

Keystone Aerial Surveys, Inc., 1970, *Aerial Photo of Rentschler Airport and Surrounding Areas*, East Hartford, CT.

Keystone Aerial Surveys, Inc., 1975, *Aerial Photo of Rentschler Airport and Surrounding Areas*, East Hartford, CT.

TABLES

Table 1
SUMMARY OF SAMPLING AND ANALYTICAL INFORMATION
P&W East Hartford: DEBRIS Pile

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Page 1 of 1

Sample Information						Analysis Information								
Location ID	Sample ID	Sample Date	From (ft)	To (ft)	Class	Portable GC	Volatile Organics	Semivolatile Organics	Herbicides	Pesticides	PCBs	Metals	Extraction	Miscellaneous
SK-SB-130	1026209	2/ 6/97	0	2	SB	x	x	x			x	X		x
SK-SB-130	1026210	2/ 6/97	2	4	SB	x								
SK-SB-130	1026211	2/ 6/97	4	6	SB	x								
SK-SB-130	1026212	2/ 6/97	6	8	SB	x	x				x	X		x
SK-SB-130	1026213	2/ 6/97	8	10	SB	x								
SK-SB-130	1026201	2/ 6/97	9	10	GW			x			x	X		x
SK-SB-130	1026214	2/ 6/97	10	12	SB	x								
SK-SB-130	1026215	2/ 6/97	12	14	SB	x								
SK-SB-130	1026225	2/ 7/97	9.0	11.0	GW		x							
SK-SB-131	1026216	2/ 6/97	0	2	SB	x	x	x			x	X		x
SK-SB-131	1026217	2/ 6/97	0	2	SB	x								
SK-SB-131	1026218	2/ 6/97	2	4	SB	x								
SK-SB-131	1026219	2/ 6/97	4	6	SB	x								
SK-SB-131	1026220	2/ 6/97	6	8	SB	x								
SK-SB-131	1026221	2/ 6/97	8	10	SB	x	x				x	X		x
SK-SB-131	1026202	2/ 6/97	9	10	GW			x			x	x		x
SK-SB-131	1026222	2/ 6/97	10	12	SB	x								
SK-SB-131	1026223	2/ 6/97	12	14	SB	x								
SK-SB-131	1026224	2/ 6/97	14	16	SB	x								
SK-SB-131	1026226	2/ 7/97	9.0	11.0	GW		x							

Notes: 1. Legend: X - Analysed; at least one analyte over the detection limit; x - Analysed, no analytes in group over the detection limit

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: DEBRIS File

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	Location ID	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130
	Sample ID	1026209	1026209	1026210	1026211	1026212	1026212	1026213
	Sample Date	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997
	Sample Time	10:40	10:40	10:45	10:55	11:00	11:00	11:15
	Sample Depth	0' - 2'	0' - 2'	2' - 4'	4' - 6'	6' - 8'	6' - 8'	8' - 10'
	Laboratory	AEL	LEA	LEA	LEA	AEL	LEA	LEA
	Lab. Number	AEL97001964	97-1287-139	97-1288-140	97-1289-141	AEL97001965	97-1290-142	97-1291-143
Constituent	Units							
Date Metals Analyzed	-	02/19/1997				02/19/1997		
Date Organics Analyzed	-	02/20/1997	02/10/1997	02/10/1997	02/10/1997	02/20/1997	02/10/1997	02/10/1997
Date PCBs Analyzed	-	02/26/1997				02/26/1997		
Date Semi-volatile Organics Analyzed	-	03/04/1997						
Arsenic	mg/kg	1.64				2.06		
Barium	mg/kg	27.4				42.8		
Cadmium	mg/kg	<3.6				<3.78		
Chromium	mg/kg	14.4				9.31		
Lead	mg/kg	<24				<25.2		
Mercury	mg/kg	<0.0960				<0.101		
Nickel	mg/kg	<12				<12.6		
Selenium	mg/kg	<1.2				<1.26		
Silver	mg/kg	<6.0				<6.29		
Zinc	mg/kg	21.6				23.2		
PCB 1016	µg/kg	<240				<260		
PCB 1221	µg/kg	<240				<260		
PCB 1232	µg/kg	<240				<260		
PCB 1242	µg/kg	<240				<260		
PCB 1248	µg/kg	<240				<260		
PCB 1254	µg/kg	<240				<260		
PCB 1260	µg/kg	<240				<260		
Total Petroleum Hydrocarbons	mg/kg	<39.5				<43.3		
Acenaphthene	µg/kg	<400						
Acenaphthylene	µg/kg	<400						
Anthracene	µg/kg	<400						
Benzidine	µg/kg	<400						
Benzo[a]anthracene	µg/kg	<400						
Benzo[a]pyrene	µg/kg	<400						

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: DEBRIS Pile

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	Location ID	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130
	Sample ID	1026209	1026209	1026210	1026211	1026212	1026212	1026213
	Sample Date	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997
	Sample Time	10:40	10:40	10:45	10:55	11:00	11:00	11:15
	Sample Depth	0' - 2'	0' - 2'	2' - 4'	4' - 6'	6' - 8'	6' - 8'	8' - 10'
	Laboratory	AEL	LEA	LEA	LEA	AEL	LEA	LEA
	Lab. Number	AEL97001964	97-1287-139	97-1288-140	97-1289-141	AEL97001965	97-1290-142	97-1291-143
Constituent	Units							
Benzo[b]fluoranthene	µg/kg	<400						
Benzo[ghi]perylene	µg/kg	<400						
Benzo[k]fluoranthene	µg/kg	<400						
Bis(2-chloroethoxy)methane	µg/kg	<400						
Bis(2-chloroethyl) Ether	µg/kg	<400						
Bis(2-ethylhexyl)phthalate	µg/kg	<400						
Bromophenyl Phenyl Ether,4-	µg/kg	<400						
Butyl Benzyl Phthalate	µg/kg	<400						
Chloronaphthalene,2-	µg/kg	<400						
Chlorophenol,2-	µg/kg	<400						
Chlorophenyl Phenyl Ether,4-	µg/kg	<400						
Chrysene	µg/kg	<400						
Di-n-butyl Phthalate	µg/kg	<400						
Di-n-octyl Phthalate	µg/kg	<400						
Dibenzo[a,h]anthracene	µg/kg	<400						
Dichlorobenzidine,3,3'-	µg/kg	<400						
Dichlorophenol,2,4-	µg/kg	<400						
Diethyl Phthalate	µg/kg	<400						
Dimethyl Phthalate	µg/kg	<400						
Dimethylphenol,2,4-	µg/kg	<400						
Dinitro-o-cresol,4,6-	µg/kg	<400						
Dinitrophenol,2,4-	µg/kg	<400						
Dinitrotoluene,2,4-	µg/kg	<400						
Dinitrotoluene,2,6-	µg/kg	<400						
Diphenylhydrazine,1,2-	µg/kg	<400						
Fluoranthene	µg/kg	<400						
Fluorene	µg/kg	<400						
Hexachlorobenzene	µg/kg	<400						

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: DEBRIS File

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	Location ID	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130
	Sample ID	1026209	1026209	1026210	1026211	1026212	1026212	1026213
	Sample Date	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997
	Sample Time	10:40	10:40	10:45	10:55	11:00	11:00	11:15
	Sample Depth	0' - 2'	0' - 2'	2' - 4'	4' - 6'	6' - 8'	6' - 8'	8' - 10'
	Laboratory	AEL	LEA	LEA	LEA	AEL	LEA	LEA
	Lab. Number	AEL97001964	97-1287-139	97-1288-140	97-1289-141	AEL97001965	97-1290-142	97-1291-143
Constituent	Units							
Hexachlorobutadiene	µg/kg	<400						
Hexachlorocyclopentadiene	µg/kg	<400						
Hexachloroethane	µg/kg	<400						
Indeno(1,2,3-cd)pyrene	µg/kg	<400						
Isophorone	µg/kg	<400						
N-nitroso-n-propylamine	µg/kg	<400						
N-nitrosodimethylamine	µg/kg	<400						
N-nitrosodiphenylamine	µg/kg	<400						
Naphthalene	µg/kg	<400						
Nitrobenzene	µg/kg	<400						
Nitrophenol, 2-	µg/kg	<400						
Nitrophenol, 4-	µg/kg	<400						
Pentachlorophenol	µg/kg	<400						
Phenanthrene	µg/kg	<400						
Phenol	µg/kg	<400						
Propane), 2,2'-oxybis(2-chloro-	µg/kg	<400						
Pyrene	µg/kg	<400						
Trichlorobenzene, 1,2,4-	µg/kg	<400						
Trichlorophenol, 2,4,6-	µg/kg	<400						
Acetone	µg/kg	<86				<73		
Acrolein	µg/kg	<39				<24		
Acrylonitrile	µg/kg	<39				<24		
Benzene	µg/kg	<16				<9.8		
Benzene (screening)	µg/kg		<8	<8	<8		<8	<8
Bromobenzene	µg/kg	<16				<9.8		
Bromoform	µg/kg	<16				<9.8		
Carbon Disulfide	µg/kg	<16				<9.8		
Carbon Tetrachloride	µg/kg	<16				<9.8		

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: DEBRIS Pile

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	Location ID	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130	SK-SB-130
	Sample ID	1026209	1026209	1026210	1026211	1026212	1026212	1026213
	Sample Date	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997
	Sample Time	10:40	10:40	10:45	10:55	11:00	11:00	11:15
	Sample Depth	0' - 2'	0' - 2'	2' - 4'	4' - 6'	6' - 8'	6' - 8'	8' - 10'
	Laboratory	AEL	LEA	LEA	LEA	AEL	LEA	LEA
	Lab. Number	AEL97001964	97-1287-139	97-1288-140	97-1289-141	AEL97001965	97-1290-142	97-1291-143
Constituent	Units							
Chlorobenzene	µg/kg	<16				<9.8		
Chlorodibromomethane	µg/kg	<16				<9.8		
Chloroethane	µg/kg	<16				<9.8		
Chloroethyl Vinyl Ether,2-	µg/kg	<16				<9.8		
Chloroform	µg/kg	<16				<9.8		
Chlorotoluene,o-	µg/kg	<16				<9.8		
Chlorotoluene,p-	µg/kg	<16				<9.8		
Dibromomethane	µg/kg	<16				<9.8		
Dichlorobenzene,1,2-	µg/kg	<16				<9.8		
Dichlorobenzene,1,3-	µg/kg	<16				<9.8		
Dichlorobenzene,1,4-	µg/kg	<16				<9.8		
Dichlorobromomethane	µg/kg	<16				<9.8		
Dichlorodifluoromethane	µg/kg	<16				<9.8		
Dichloroethane,1,1-	µg/kg	<16				<9.8		
Dichloroethane,1,2-	µg/kg	<16				<9.8		
Dichloroethylene,1,1-	µg/kg	<16				<9.8		
Dichloroethylene,1,2-cis-	µg/kg	<16				<9.8		
Dichloroethylene,1,2-trans-	µg/kg	<16				<9.8		
Dichloropropane,1,2-	µg/kg	<16				<9.8		
Dichloropropylene,1,3-cis-	µg/kg	<16				<9.8		
Dichloropropylene,1,3-trans-	µg/kg	<16				<9.8		
Ethylbenzene	µg/kg	<16				<9.8		
Ethylbenzene (screening)	µg/kg		<17	<17	<17		<17	<17
Hexanone,2-	µg/kg	<39				<24		
Methyl Bromide	µg/kg	<16				<9.8		
Methyl Chloride	µg/kg	<16				<9.8		
Methyl Ethyl Ketone	µg/kg	<39				<24		
Methyl-2-pentanone,4-	µg/kg	<39				<24		

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: DEBRIS Pile

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	Location ID	SK-SB-130	SK-SB-130	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131
	Sample ID	1026214	1026215	1026216	1026216	1026217	1026218	1026219
	Sample Date	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997
	Sample Time	11:17	11:30	13:15	13:15	13:25	13:30	13:35
	Sample Depth	10' - 12'	12' - 14'	0' - 2'	0' - 2'	0' - 2'	2' - 4'	4' - 6'
	Laboratory	LEA	LEA	AEL	LEA	LEA	LEA	LEA
	Lab. Number	97-1292-144	97-1294-146	AEL97001966	97-1295-147	97-1296-148	97-1297-149	97-1298-150
Constituent	Units							
Date Metals Analyzed	-			02/19/1997				
Date Organics Analyzed	-	02/10/1997	02/10/1997	02/20/1997	02/10/1997	02/10/1997	02/10/1997	02/10/1997
Date PCBs Analyzed	-			02/26/1997				
Date Semi-volatile Organics Analyzed	-			03/06/1997				
Arsenic	mg/kg			0.721				
Barium	mg/kg			11				
Cadmium	mg/kg			<3.61				
Chromium	mg/kg			7.94				
Lead	mg/kg			<24.1				
Mercury	mg/kg			<0.10				
Nickel	mg/kg			<12				
Selenium	mg/kg			<1.2				
Silver	mg/kg			<6.02				
Zinc	mg/kg			15.2				
PCB 1016	µg/kg			<240				
PCB 1221	µg/kg			<240				
PCB 1232	µg/kg			<240				
PCB 1242	µg/kg			<240				
PCB 1248	µg/kg			<240				
PCB 1254	µg/kg			<240				
PCB 1260	µg/kg			<240				
Total Petroleum Hydrocarbons	mg/kg			<48.0				
Acenaphthene	µg/kg			<400				
Acenaphthylene	µg/kg			<400				
Anthracene	µg/kg			<400				
Benzidine	µg/kg			<400				
Benzo[a]anthracene	µg/kg			<400				
Benzo[a]pyrene	µg/kg			<400				

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: DEBRIS Pile

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	Location ID	SK-SB-130	SK-SB-130	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131
	Sample ID	1026214	1026215	1026216	1026216	1026217	1026218	1026219
	Sample Date	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997
	Sample Time	11:17	11:30	13:15	13:15	13:25	13:30	13:35
	Sample Depth	10' - 12'	12' - 14'	0' - 2'	0' - 2'	0' - 2'	2' - 4'	4' - 6'
	Laboratory	LEA	LEA	AEL	LEA	LEA	LEA	LEA
	Lab. Number	97-1292-144	97-1294-146	AEL97001966	97-1295-147	97-1296-148	97-1297-149	97-1298-150
Constituent	Units							
Benzo[b]fluoranthene	µg/kg			<400				
Benzo[ghi]perylene	µg/kg			<400				
Benzo[k]fluoranthene	µg/kg			<400				
Bis(2-chloroethoxy)methane	µg/kg			<400				
Bis(2-chloroethyl) Ether	µg/kg			<400				
Bis(2-ethylhexyl)phthalate	µg/kg			<400				
Bromophenyl Phenyl Ether, 4-	µg/kg			<400				
Butyl Benzyl Phthalate	µg/kg			<400				
Chloronaphthalene, 2-	µg/kg			<400				
Chlorophenol, 2-	µg/kg			<400				
Chlorophenyl Phenyl Ether, 4-	µg/kg			<400				
Chrysene	µg/kg			<400				
Di-n-butyl Phthalate	µg/kg			<400				
Di-n-octyl Phthalate	µg/kg			<400				
Dibenzo[a,h]anthracene	µg/kg			<400				
Dichlorobenzidine, 3,3'-	µg/kg			<400				
Dichlorophenol, 2,4-	µg/kg			<400				
Diethyl Phthalate	µg/kg			<400				
Dimethyl Phthalate	µg/kg			<400				
Dimethylphenol, 2,4-	µg/kg			<400				
Dinitro-o-cresol, 4,6-	µg/kg			<400				
Dinitrophenol, 2,4-	µg/kg			<400				
Dinitrotoluene, 2,4-	µg/kg			<400				
Dinitrotoluene, 2,6-	µg/kg			<400				
Diphenylhydrazine, 1,2-	µg/kg			<400				
Fluoranthene	µg/kg			<400 N1				
Fluorene	µg/kg			<400				
Hexachlorobenzene	µg/kg			<400				

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: DEBRIS Pile

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	Location ID	SK-SB-130	SK-SB-130	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131
	Sample ID	1026214	1026215	1026216	1026216	1026217	1026218	1026219
	Sample Date	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997
	Sample Time	11:17	11:30	13:15	13:15	13:25	13:30	13:35
	Sample Depth	10' - 12'	12' - 14'	0' - 2'	0' - 2'	0' - 2'	2' - 4'	4' - 6'
	Laboratory	LEA	LEA	AEL	LEA	LEA	LEA	LEA
	Lab. Number	97-1292-144	97-1294-146	AEL97001966	97-1295-147	97-1296-148	97-1297-149	97-1298-150
Constituent	Units							
Hexachlorobutadiene	µg/kg			<400				
Hexachlorocyclopentadiene	µg/kg			<400				
Hexachloroethane	µg/kg			<400				
Indeno(1,2,3-cd)pyrene	µg/kg			<400				
Isophorone	µg/kg			<400				
N-nitroso-n-propylamine	µg/kg			<400				
N-nitrosodimethylamine	µg/kg			<400				
N-nitrosodiphenylamine	µg/kg			<400				
Naphthalene	µg/kg			<400				
Nitrobenzene	µg/kg			<400				
Nitrophenol,2-	µg/kg			<400				
Nitrophenol,4-	µg/kg			<400				
Pentachlorophenol	µg/kg			<400				
Phenanthrene	µg/kg			<400				
Phenol	µg/kg			<400				
Propane),2,2'-oxybis(2-chloro-	µg/kg			<400				
Pyrene	µg/kg			<400				
Trichlorobenzene,1,2,4-	µg/kg			<400				
Trichlorophenol,2,4,6-	µg/kg			<400				
Acetone	µg/kg			<35				
Acrolein	µg/kg			<17				
Acrylonitrile	µg/kg			<17				
Benzene	µg/kg			<6.9				
Benzene (screening)	µg/kg	<8	<8		<8	<8	<8	<8
Bromobenzene	µg/kg			<6.9				
Bromoform	µg/kg			<6.9				
Carbon Disulfide	µg/kg			<6.9				
Carbon Tetrachloride	µg/kg			<6.9				

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: DEBRIS Pile

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	Location ID	SK-SB-130	SK-SB-130	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131
	Sample ID	1026214	1026215	1026216	1026216	1026217	1026218	1026219
	Sample Date	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997
	Sample Time	11:17	11:30	13:15	13:15	13:25	13:30	13:35
	Sample Depth	10' - 12'	12' - 14'	0' - 2'	0' - 2'	0' - 2'	2' - 4'	4' - 6'
	Laboratory	LEA	LEA	AEL	LEA	LEA	LEA	LEA
	Lab. Number	97-1292-144	97-1294-146	AEL97001966	97-1295-147	97-1296-148	97-1297-149	97-1298-150
Constituent	Units							
Chlorobenzene	µg/kg			<6.9				
Chlorodibromomethane	µg/kg			<6.9				
Chloroethane	µg/kg			<6.9				
Chloroethyl Vinyl Ether,2-	µg/kg			<6.9				
Chloroform	µg/kg			<6.9				
Chlorotoluene,o-	µg/kg			<6.9				
Chlorotoluene,p-	µg/kg			<6.9				
Dibromomethane	µg/kg			<6.9				
Dichlorobenzene,1,2-	µg/kg			<6.9				
Dichlorobenzene,1,3-	µg/kg			<6.9				
Dichlorobenzene,1,4-	µg/kg			<6.9				
Dichlorobromomethane	µg/kg			<6.9				
Dichlorodifluoromethane	µg/kg			<6.9				
Dichloroethane,1,1-	µg/kg			<6.9				
Dichloroethane,1,2-	µg/kg			<6.9				
Dichloroethylene,1,1-	µg/kg			<6.9				
Dichloroethylene,1,2-cis-	µg/kg			<6.9				
Dichloroethylene,1,2-trans-	µg/kg			<6.9				
Dichloropropane,1,2-	µg/kg			<6.9				
Dichloropropylene,1,3-cis-	µg/kg			<6.9				
Dichloropropylene,1,3-trans-	µg/kg			<6.9				
Ethylbenzene	µg/kg			<6.9				
Ethylbenzene (screening)	µg/kg	<17	<17		<17	<17	<18	<17
Hexanone,2-	µg/kg			<17				
Methyl Bromide	µg/kg			<6.9				
Methyl Chloride	µg/kg			<6.9				
Methyl Ethyl Ketone	µg/kg			<17				
Methyl-2-pentanone,4-	µg/kg			<17				

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SUMMARY OF ANALYTICAL RESULTS - SOIL
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	Location ID	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	
	Sample ID	1026220	1026221	1026221	1026222	1026223	1026224	
	Sample Date	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	
	Sample Time	13:45	13:50	13:50	13:55	14:00	14:05	
	Sample Depth	6' - 8'	8' - 10'	8' - 10'	10' - 12'	12' - 14'	14' - 16'	
	Laboratory	LEA	AEL	LEA	LEA	LEA	LEA	
	Lab. Number	97-1299-151	AEL97001967	97-1300-152	97-1302-154	97-1303-155	97-1301-153	
Constituent	Units							
Date Metals Analyzed	-		02/19/1997					
Date Organics Analyzed	-	02/10/1997	02/20/1997	02/10/1997	02/10/1997	02/10/1997	02/10/1997	
Date PCBs Analyzed	-		02/26/1997					
Date Semi-volatile Organics Analyzed	-							
Arsenic	mg/kg		0.891					
Barium	mg/kg		52					
Cadmium	mg/kg		<3.68					
Chromium	mg/kg		8.46					
Lead	mg/kg		<24.5					
Mercury	mg/kg		<0.10					
Nickel	mg/kg		<12.3					
Selenium	mg/kg		<1.23					
Silver	mg/kg		<6.13					
Zinc	mg/kg		20.7					
PCB 1016	µg/kg		<240					
PCB 1221	µg/kg		<240					
PCB 1232	µg/kg		<240					
PCB 1242	µg/kg		<240					
PCB 1248	µg/kg		<240					
PCB 1254	µg/kg		<240					
PCB 1260	µg/kg		<240					
Total Petroleum Hydrocarbons	mg/kg		<43.2					
Acenaphthene	µg/kg							
Acenaphthylene	µg/kg							
Anthracene	µg/kg							
Benzidine	µg/kg							
Benzo[a]anthracene	µg/kg							
Benzo[a]pyrene	µg/kg							

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: DEBRIS Pile

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	Location ID	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	
	Sample ID	1026220	1026221	1026221	1026222	1026223	1026224	
	Sample Date	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	
	Sample Time	13:45	13:50	13:50	13:55	14:00	14:05	
	Sample Depth	6' - 8'	8' - 10'	8' - 10'	10' - 12'	12' - 14'	14' - 16'	
	Laboratory	LEA	AEL	LEA	LEA	LEA	LEA	
	Lab. Number	97-1299-151	AEL97001967	97-1300-152	97-1302-154	97-1303-155	97-1301-153	
Constituent	Units							
Benzo[b]fluoranthene	µg/kg							
Benzo[ghi]perylene	µg/kg							
Benzo[k]fluoranthene	µg/kg							
Bis(2-chloroethoxy)methane	µg/kg							
Bis(2-chloroethyl) Ether	µg/kg							
Bis(2-ethylhexyl)phthalate	µg/kg							
Bromophenyl Phenyl Ether,4-	µg/kg							
Butyl Benzyl Phthalate	µg/kg							
Chloronaphthalene,2-	µg/kg							
Chlorophenol,2-	µg/kg							
Chlorophenyl Phenyl Ether,4-	µg/kg							
Chrysene	µg/kg							
Di-n-butyl Phthalate	µg/kg							
Di-n-octyl Phthalate	µg/kg							
Dibenzo[a,h]anthracene	µg/kg							
Dichlorobenzidine,3,3'-	µg/kg							
Dichlorophenol,2,4-	µg/kg							
Diethyl Phthalate	µg/kg							
Dimethyl Phthalate	µg/kg							
Dimethylphenol,2,4-	µg/kg							
Dinitro-o-cresol,4,6-	µg/kg							
Dinitrophenol,2,4-	µg/kg							
Dinitrotoluene,2,4-	µg/kg							
Dinitrotoluene,2,6-	µg/kg							
Diphenylhydrazine,1,2-	µg/kg							
Fluoranthene	µg/kg							
Fluorene	µg/kg							
Hexachlorobenzene	µg/kg							

Notes: 1. Printed on 05/21/98

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: DEBRIS Pile

DRAFT

Page 13 of 15

	Location ID	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	
	Sample ID	1026220	1026221	1026221	1026222	1026223	1026224	
	Sample Date	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	
	Sample Time	13:45	13:50	13:50	13:55	14:00	14:05	
	Sample Depth	6' - 8'	8' - 10'	8' - 10'	10' - 12'	12' - 14'	14' - 16'	
	Laboratory	LEA	AEL	LEA	LEA	LEA	LEA	
	Lab. Number	97-1299-151	AEL97001967	97-1300-152	97-1302-154	97-1303-155	97-1301-153	
Constituent	Units							
Hexachlorobutadiene	µg/kg							
Hexachlorocyclopentadiene	µg/kg							
Hexachloroethane	µg/kg							
Indeno(1,2,3-cd)pyrene	µg/kg							
Isophorone	µg/kg							
N-nitroso-n-propylamine	µg/kg							
N-nitrosodimethylamine	µg/kg							
N-nitrosodiphenylamine	µg/kg							
Naphthalene	µg/kg							
Nitrobenzene	µg/kg							
Nitrophenol,2-	µg/kg							
Nitrophenol,4-	µg/kg							
Pentachlorophenol	µg/kg							
Phenanthrene	µg/kg							
Phenol	µg/kg							
Propane),2,2'-oxybis(2-chloro-	µg/kg							
Pyrene	µg/kg							
Trichlorobenzene,1,2,4-	µg/kg							
Trichlorophenol,2,4,6-	µg/kg							
Acetone	µg/kg		<43					
Acrolein	µg/kg		<21					
Acrylonitrile	µg/kg		<21					
Benzene	µg/kg		<8.5					
Benzene (screening)	µg/kg	<8		<8	<8	<8	<8	
Bromobenzene	µg/kg		<8.5					
Bromoform	µg/kg		<8.5					
Carbon Disulfide	µg/kg		<8.5					
Carbon Tetrachloride	µg/kg		<8.5					

Notes: 1. Printed on 05/21/98

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Table 3
SUMMARY OF ANALYTICAL RESULTS - SOIL
P&W East Hartford: DEBRIS Pile

DRAFT

Page 14 of 15

	Location ID	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	SK-SB-131	
	Sample ID	1026220	1026221	1026221	1026222	1026223	1026224	
	Sample Date	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	02/06/1997	
	Sample Time	13:45	13:50	13:50	13:55	14:00	14:05	
	Sample Depth	6' - 8'	8' - 10'	8' - 10'	10' - 12'	12' - 14'	14' - 16'	
	Laboratory	LEA	AEL	LEA	LEA	LEA	LEA	
	Lab. Number	97-1299-151	AEL97001967	97-1300-152	97-1302-154	97-1303-155	97-1301-153	
Constituent	Units							
Chlorobenzene	µg/kg		<8.5					
Chlorodibromomethane	µg/kg		<8.5					
Chloroethane	µg/kg		<8.5					
Chloroethyl Vinyl Ether,2-	µg/kg		<8.5					
Chloroform	µg/kg		<8.5					
Chlorotoluene,o-	µg/kg		<8.5					
Chlorotoluene,p-	µg/kg		<8.5					
Dibromomethane	µg/kg		<8.5					
Dichlorobenzene,1,2-	µg/kg		<8.5					
Dichlorobenzene,1,3-	µg/kg		<8.5					
Dichlorobenzene,1,4-	µg/kg		<8.5					
Dichlorobromomethane	µg/kg		<8.5					
Dichlorodifluoromethane	µg/kg		<8.5					
Dichloroethane,1,1-	µg/kg		<8.5					
Dichloroethane,1,2-	µg/kg		<8.5					
Dichloroethylene,1,1-	µg/kg		<8.5					
Dichloroethylene,1,2-cis-	µg/kg		<8.5					
Dichloroethylene,1,2-trans-	µg/kg		<8.5					
Dichloropropane,1,2-	µg/kg		<8.5					
Dichloropropylene,1,3-cis-	µg/kg		<8.5					
Dichloropropylene,1,3-trans-	µg/kg		<8.5					
Ethylbenzene	µg/kg		<8.5					
Ethylbenzene (screening)	µg/kg	<17		<16	<17	<17	<17	
Hexanone,2-	µg/kg		<21					
Methyl Bromide	µg/kg		<8.5					
Methyl Chloride	µg/kg		<8.5					
Methyl Ethyl Ketone	µg/kg		<21					
Methyl-2-pentanone,4-	µg/kg		<21					

Notes: 1. Printed on 05/21/98

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Notes: 1. Printed on 05/21/98

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Notes: 1. Only Detects Shown
2. Printed on 05/21/98

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Table 5
SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
P&W East Hartford: DEBRIS Pile

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Page 1 of 5

	Location ID	SK-SB-130	SK-SB-130	SK-SB-131	SK-SB-131			
	Sample ID	1026201	1026225	1026202	1026226			
	Sample Date	02/06/1997	02/07/1997	02/06/1997	02/07/1997			
	Sample Time	12:10	11:55	15:00	14:10			
	Sample Depth	9' - 10'	9.0' - 11.0'	9' - 10'	9.0' - 11.0'			
	Laboratory	AEL	AEL	AEL	AEL			
	Lab. Number	AEL97001658	AEL97001701	AEL97001659	AEL97001702			
Constituent	Units							
Depth to Water	FT	8.5						
Date Metals Analyzed	-	02/13/1997		02/13/1997				
Date Organics Analyzed	-		02/19/1997		02/19/1997			
Date PCBs Analyzed	-	02/26/1997		02/26/1997				
Date Semi-volatile Organics Analyzed	-	02/22/1997		02/22/1997				
Arsenic	mg/L	<0.004		<0.004				
Barium	mg/L	0.167		<0.050				
Cadmium	mg/L	<0.0010		<0.0010				
Chromium	mg/L	<0.050		<0.050				
Copper	mg/L	<0.040		<0.040				
Lead	mg/L	<0.0050		<0.0050				
Mercury	mg/L	0.0005		<0.0004				
Nickel	mg/L	<0.10		<0.10				
Selenium	mg/L	<0.010		<0.010				
Silver	mg/L	<0.027		<0.027				
Zinc	mg/L	<0.050		<0.050				
PCB 1016	µg/L	<1.0		<0.50				
PCB 1221	µg/L	<1.0		<0.50				
PCB 1232	µg/L	<1.0		<0.50				
PCB 1242	µg/L	<1.0		<0.50				
PCB 1248	µg/L	<1.0		<0.50				
PCB 1254	µg/L	<1.0		<0.20				
PCB 1260	µg/L	<1.0		<0.20				
Total Petroleum Hydrocarbons	mg/L	<0.5		<0.5				
Acenaphthene	µg/L	<11		<10				
Acenaphthylene	µg/L	<1.7 MDL		<1.6 MDL				
Anthracene	µg/L	<11		<10				
Benzidine	µg/L	<11		<10				

Notes: 1. Printed on 05/21/98

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Table 5
SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
P&W East Hartford: DEBRIS Pile

DRAFT

Page 2 of 5

	Location ID	SK-SB-130	SK-SB-130	SK-SB-131	SK-SB-131			
	Sample ID	1026201	1026225	1026202	1026226			
	Sample Date	02/06/1997	02/07/1997	02/06/1997	02/07/1997			
	Sample Time	12:10	11:55	15:00	14:10			
	Sample Depth	9' - 10'	9.0' - 11.0'	9' - 10'	9.0' - 11.0'			
	Laboratory	AEL	AEL	AEL	AEL			
	Lab. Number	AEL97001658	AEL97001701	AEL97001659	AEL97001702			
Constituent	Units							
Benzo[a]anthracene	µg/L	<0.86 MDL		<0.82 MDL				
Benzo[a]pyrene	µg/L	<0.39 MDL		<0.37 MDL				
Benzo[b]fluoranthene	µg/L	<0.53 MDL		<0.51 MDL				
Benzo[ghi]perylene	µg/L	<11		<10				
Benzo[k]fluoranthene	µg/L	<0.63 MDL		<0.60 MDL				
Bis(2-chloroethoxy)methane	µg/L	<11		<10				
Bis(2-chloroethyl) Ether	µg/L	<11		<10				
Bis(2-ethylhexyl)phthalate	µg/L	<3.6 U		<1.3 MDL				
Bromophenyl Phenyl Ether,4-	µg/L	<11		<10				
Butyl Benzyl Phthalate	µg/L	<11		<10				
Chloronaphthalene,2-	µg/L	<11		<10				
Chlorophenol,2-	µg/L	<11		<10				
Chlorophenyl Phenyl Ether,4-	µg/L	<11		<10				
Chrysene	µg/L	<11		<10				
Di-n-butyl Phthalate	µg/L	<11		<10				
Di-n-octyl Phthalate	µg/L	<11		<10				
Dibenzo[a,h]anthracene	µg/L	<11		<10				
Dichlorobenzidine,3,3'-	µg/L	<11		<10				
Dichlorophenol,2,4-	µg/L	<11		<10				
Diethyl Phthalate	µg/L	<11		<10				
Dimethyl Phthalate	µg/L	<11		<10				
Dimethylphenol,2,4-	µg/L	<11		<10				
Dinitro-o-cresol,4,6-	µg/L	<11		<10				
Dinitrophenol,2,4-	µg/L	<11		<10				
Dinitrotoluene,2,4-	µg/L	<11		<10				
Dinitrotoluene,2,6-	µg/L	<11		<10				
Diphenylhydrazine,1,2-	µg/L	<11		<10				
Fluoranthene	µg/L	<11		<10				

Notes: 1. Printed on 05/21/98

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Table 5
SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
P&W East Hartford: DEBRIS Pile

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Page 3 of 5

Location ID	SK-SB-130	SK-SB-130	SK-SB-131	SK-SB-131			
Sample ID	1026201	1026225	1026202	1026226			
Sample Date	02/06/1997	02/07/1997	02/06/1997	02/07/1997			
Sample Time	12:10	11:55	15:00	14:10			
Sample Depth	9' - 10'	9.0' - 11.0'	9' - 10'	9.0' - 11.0'			
Laboratory	AEL	AEL	AEL	AEL			
Lab. Number	AEL97001658	AEL97001701	AEL97001659	AEL97001702			
Constituent	Units						
Fluorene	µg/L	<11		<10			
Hexachlorobenzene	µg/L	<1.3 MDL		<1.2 MDL			
Hexachlorobutadiene	µg/L	<11		<10			
Hexachlorocyclopentadiene	µg/L	<11		<10			
Hexachloroethane	µg/L	<1.3 MDL		<1.2 MDL			
Indeno(1,2,3-cd)pyrene	µg/L	<11		<10			
Isophorone	µg/L	<11		<10			
N-nitroso-n-propylamine	µg/L	<11		<10			
N-nitrosodimethylamine	µg/L	<11		<10			
N-nitrosodiphenylamine	µg/L	<11		<10			
Naphthalene	µg/L	<11		<10			
Nitrobenzene	µg/L	<11		<10			
Nitrophenol,2-	µg/L	<11		<10			
Nitrophenol,4-	µg/L	<11		<10			
Pentachlorophenol	µg/L	<0.66 MDL		<0.63 MDL			
Phenanthrene	µg/L	<1.1 MDL		<1.1 MDL			
Phenol	µg/L	<11		<10			
Propane),2,2'-oxybis(2-chloro-	µg/L	<11		<10			
Pyrene	µg/L	<11		<10			
Trichlorobenzene,1,2,4-	µg/L	<11		<10			
Trichlorophenol,2,4,6-	µg/L	<11		<10			
Acetone	µg/L		<6.0		<4.0		
Acrolein	µg/L		<15		<15		
Acrylonitrile	µg/L		<0.65		<0.65		
Benzene	µg/L		<1.0		<1.0		
Bromobenzene	µg/L		<1.0		<1.0		
Bromoform	µg/L		<1.0		<1.0		
Carbon Disulfide	µg/L		<1.0		<1.0		

Notes: 1. Printed on 05/21/98

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Table 5
SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
P&W East Hartford: DEBRIS Pile

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	Location ID	SK-SB-130	SK-SB-130	SK-SB-131	SK-SB-131			
	Sample ID	1026201	1026225	1026202	1026226			
	Sample Date	02/06/1997	02/07/1997	02/06/1997	02/07/1997			
	Sample Time	12:10	11:55	15:00	14:10			
	Sample Depth	9' - 10'	9.0' - 11.0'	9' - 10'	9.0' - 11.0'			
	Laboratory	AEL	AEL	AEL	AEL			
	Lab. Number	AEL97001658	AEL97001701	AEL97001659	AEL97001702			
Constituent	Units							
Carbon Tetrachloride	µg/L		<1.0		<1.0			
Chlorobenzene	µg/L		<1.0		<1.0			
Chlorodibromomethane	µg/L		<0.50		<0.50			
Chloroethane	µg/L		<1.0		<1.0			
Chloroethyl Vinyl Ether,2-	µg/L		<1.0		<1.0			
Chloroform	µg/L		<1.0		<1.0			
Chlorotoluene,o-	µg/L		<1.0		<1.0			
Chlorotoluene,p-	µg/L	<11	<1.0	<10	<1.0			
Dibromomethane	µg/L		<1.0		<1.0			
Dichlorobenzene,1,2-	µg/L	<11	<1.0	<10	<1.0			
Dichlorobenzene,1,3-	µg/L	<11	<1.0	<10	<1.0			
Dichlorobenzene,1,4-	µg/L	<11	<1.0	<10	<1.0			
Dichlorobromomethane	µg/L		<1.0		<1.0			
Dichlorodifluoromethane	µg/L		<1.0		<1.0			
Dichloroethane,1,1-	µg/L		<1.0		<1.0			
Dichloroethane,1,2-	µg/L		<1.0		<1.0			
Dichloroethylene,1,1-	µg/L		<1.0		<1.0			
Dichloroethylene,1,2-cis-	µg/L		<1.0		<1.0			
Dichloroethylene,1,2-trans-	µg/L		<1.0		<1.0			
Dichloropropane,1,2-	µg/L		<1.0		<1.0			
Dichloropropylene,1,3-cis-	µg/L		<0.50		<0.50			
Dichloropropylene,1,3-trans-	µg/L		<0.50		<0.50			
Ethylbenzene	µg/L		<1.0		<1.0			
Hexanone,2-	µg/L		<2.0		<2.0			
Methyl Bromide	µg/L		<1.0		<1.0			
Methyl Chloride	µg/L		<1.0		<1.0			
Methyl Ethyl Ketone	µg/L		<2.0		<2.0			
Methyl-2-pentanone,4-	µg/L		<2.0		<2.0			

Notes: 1. Printed on 05/21/98

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Notes: 1. Printed on 05/21/98

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UNIT-SPECIFIC TECHNICAL MEMORANDUM: SOUTH KLONDIKE AREA UNDEVELOPED LAND

PRATT & WHITNEY, EAST HARTFORD, CT

START COPY

AREA: South Klondike

SUB-AREA: Undeveloped Land Area

ENVIRONMENTAL UNIT: Undeveloped Land Area

Location: The location for this unit is east of the developed portion of the South Klondike Area (Drawing 1).

Description: The Undeveloped Land Area, consisting of approximately 47 wooded acres, was not developed during the period of Pratt & Whitney (P&W) ownership. Available mapping of the area (Petersen and Hoffman, 1953) indicates the various parcels of land that P&W purchased over the years. These parcels were purchased beginning in the early 1950's.

Dates of Operation: No operations had reportedly been performed in the Undeveloped Land Area within the South Klondike Area during the period of P&W ownership.

Processes: No reported use.

Aerial Photographs: Large-scale aerial photographs for 1965, 1970, and 1975 were obtained from Keystone Aerial Surveys, Inc. A review of the 1965 aerial photograph indicates that the area consisted of mostly trees. One particular feature that can be identified from this photograph is an "L-shaped" mark. Although this mark seems unusual, earlier aerial photographs (Fairchild, 1934) indicate that this particular area appeared to have been cultivated for a different period of time than the surrounding areas. The differences in the period of cultivation resulted in shorter trees and the apparent "L-shaped" marking.

Specific Contaminants of Concern: Since P&W acquired the land, no activities have been conducted at this unit. Therefore, no contaminants are believed to be present.

Potential Release Mechanism: Since no activities have occurred during P&W's ownership, no release mechanism is expected.

INVESTIGATION AND REMEDIATION ACTIVITIES:

Various groundwater investigations have been conducted in the South Klondike Undeveloped Land Area since 1990. In the South Klondike Area, monitoring wells SK-MW-01 through SK-MW-04 were installed in February 1990 during the Preliminary Reconnaissance Survey of the Airport/Klondike Area by Westinghouse Environmental and Geotechnical Services, Inc. (Westinghouse). Wells SK-MW-09 and SK-MW-10 were installed in October 1991 during the Site-Wide Environmental Monitoring Program at the Main Street facility by Haley & Aldrich, Inc. (H&A). The monitoring well locations are shown on Drawing 1.

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These monitoring wells were installed as part of the site-wide investigations of groundwater contamination. These wells were installed to provide general information on background and upgradient groundwater quality as well as information about the site stratigraphy. Due to the lack of activity for this unit, soil samples were not collected for laboratory analysis during the installation of these monitoring wells.

Supplemental groundwater investigations have been conducted in the South Klondike Undeveloped Area since the installation of the monitoring wells. In order to be as comprehensive as possible, presentation of this incidental data is discussed as part of this Unit-Specific Technical Memorandum. A summary of the samples collected and analyses performed is included in Table 1.

The groundwater samples for these monitoring wells indicated the presence of a single volatile organic compound (VOC) and total petroleum hydrocarbons (TPH). The presence of TPH and tetrachloroethylene (PCE) were detected in monitoring wells SK-MW-02 and SK-MW-09, respectively. The detection of these constituents were isolated events and were not detected in subsequent sampling events.

One or more of the metals analyzed were detected in the groundwater samples collected and analyzed from every monitoring well. These metals include barium, chromium, lead, and zinc. The concentrations of the metals detected are typical of background concentrations and are not indicative of a release from this unit. For a more detailed account of the groundwater sampling refer to *Technical Memorandum 3, Groundwater Sampling and Quality*. Since this unit has never been developed during P&W's ownership and no releases are expected. Therefore, subsurface soil investigations are not warranted for this unit.

REFERENCES:

Fairchild Aerial Survey, 1934.

Keystone Aerial Surveys, Inc., 1965, *Aerial Photo of Rentschler Airport and Surrounding Areas*, East Hartford, CT.

Petersen and Hoffman Engineers, Revised 1988, *Property of East Hartford Plant*, prepared for Pratt & Whitney.

TABLES

Table 1
SUMMARY OF SAMPLING AND ANALYTICAL INFORMATION
P&W East Hartford: SK Undeveloped Land Area

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Page 1 of 1

Sample Information						Analysis Information								
Location ID	Sample ID	Sample Date	From (ft)	To (ft)	Class	Portable GC	Volatile Organics	Semivolatile Organics	Herbicides	Pesticides	PCBs	Metals	Extraction	Miscellaneous
SK-MW-01	CW1900309	3/ 9/90	8.00	13.00	GW		x	x						
SK-MW-01	1018049	9/10/96	8.00	13.00	GW		x				x	x		x
SK-MW-01	1634453	6/ 3/97	8.0	13.0	GW							X		
SK-MW-01	1647368	11/24/97	8.0	13.0	GW							X		
SK-MW-02	CW3900309	3/ 9/90	9.00	19.00	GW		x	x						
SK-MW-02	1018172	9/11/96	9.00	19.00	GW		x				x	X		X
SK-MW-02	1634456	6/ 3/97	9.0	19.0	GW			x				x		x
SK-MW-02	1647371	11/24/97	9	19	GW			x				X		x
SK-MW-03	CW4900309	3/ 9/90	6.00	16.00	GW		x	x						
SK-MW-03	1018173	9/11/96	6.00	16.00	GW		x				x	X		x
SK-MW-03	1634455	6/ 3/97	6.0	16.0	GW							x		
SK-MW-03	1647370	11/24/97	6.0	16.0	GW							X		
SK-MW-04	CW5900309	3/ 9/90	5.60	15.60	GW		x	x						
SK-MW-04	1018174	9/11/96	5.60	15.60	GW		x				x	X		x
SK-MW-04	1634454	6/ 3/97	5.6	15.6	GW							X		
SK-MW-04	1647369	11/24/97	5.6	15.6	GW							x		
SK-MW-09	02091111391	11/14/91	5.00	15.00	GW	x						X		
SK-MW-09	02091060992	6/10/92	5.00	15.00	GW	X						X		
SK-MW-09	1018051	9/10/96	5.00	15.00	GW		x				x	X		x
SK-MW-09	1634450	6/ 3/97	5.0	15.0	GW		x					x		
SK-MW-09	1647354	11/21/97	5.0	15.0	GW		x					x		
SK-MW-10	02101111391	11/14/91	5.00	15.00	GW	x						X		
SK-MW-10	02101060992	6/10/92	5.00	15.00	GW	x						X		
SK-MW-10	1018050	9/10/96	5.00	15.00	GW		x				x	X		x
SK-MW-10	1634451	6/ 3/97	5.0	15.0	GW							X		
SK-MW-10	1634452	6/ 3/97	5.0	15.0	GW							x		
SK-MW-10	1647366	11/24/97	5.0	15.0	GW							X		
SK-MW-10	1647367	11/24/97	5.0	15.0	GW							x		

Notes: 1. Legend: X - Analysed; at least one analyte over the detection limit; x - Analysed, no analytes in group over the detection limit

2. Printed on 05/14/98

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DRAWINGS